

Zoom in Mathematical Literacy Grade 10

Solutions to worksheets and exam-type questions in Practice Book

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Topic 1 – Measurement

Worksheet 1 Length and distance: units and conversion

- 1.1 mm (or cm) ✓
- 1.2 m (or cm) ✓
- 1.3 mm ✓
- 1.4 mm ✓
- 1.5 km (or m) ✓
- 1.6 mm (or cm) ✓
- 1.7 cm ✓
- 1.8 m ✓
- 1.9 m ✓
- 1.10 m ✓
- 1.11 m ✓
- 1.12 km ✓
- 1.13 m (or cm) ✓
- 1.14 km ✓
- 1.15 km ✓
- 1.16 km ✓
- 1.17 km ✓
- 1.18 mm ✓
- 1.19 m ✓
- 1.20 mm (or cm) ✓

- 2.1 $4,5 \text{ cm} \times 10 = 45 \text{ mm}$ ✓✓
- 2.2 $0,120 \text{ m} \times 100 = 12 \text{ cm}$ ✓✓
- 2.3 $\frac{450 \text{ m}}{1000} = 0,45 \text{ km}$ ✓✓
- 2.4 $\frac{7500 \text{ mm}}{1000} = 7,5 \text{ m}$ ✓✓
- 2.5 $10,5 \text{ m} \times 1000 = 10500 \text{ mm}$ ✓✓

- 3.1 $\frac{850 \text{ cm}}{100} + \frac{15000 \text{ mm}}{1000} = 8,5 \text{ m} + 15 \text{ m} = 23,5 \text{ m}$ ✓✓✓
- 3.2 $4 \times (720 \text{ cm} \times 10) + 3 \times (3,5 \text{ m} \times 1000) = 4(7200 \text{ mm}) + 3(3500 \text{ mm})$
 $= 28800 \text{ mm} + 10500 \text{ mm} = 39300 \text{ mm}$ ✓✓✓✓
- 3.3 $2(120000 \text{ m} \div 1000) \times 3 = 720 \text{ km}$ ✓✓✓
- 3.4 $\frac{2000 \text{ mm}}{1000} \times 15 = 2 \text{ m} \times 15 = 30 \text{ m}$ ✓✓✓
- 3.5 $\frac{1500 \text{ cm}}{100} = 15 \text{ m}$; $\frac{3000 \text{ mm}}{1000} = 3 \text{ m}$; $\frac{15}{3} = 5 \text{ floors}$ ✓✓✓✓
- 3.6 $15 \text{ km} \times 1000 = 15000 \text{ m}$; $\frac{150 \text{ cm}}{100} = 1,5 \text{ m}$; $\frac{15000}{1,5} = 10000 \text{ turns}$ ✓✓✓✓
- 3.7 $\frac{400 \text{ mm}}{1000} = 0,4 \text{ m}$; $0,4 \text{ m} \times 15 = 6 \text{ m}$ ✓✓✓
- 3.8 $62 \text{ cm} + \left(\frac{131 \text{ mm}}{10}\right) + (0,41 \text{ m} \times 100) = 62 \text{ cm} + 13,1 \text{ cm} + 41 \text{ cm} = 116,1 \text{ cm}$ ✓✓✓
- 3.9 $\frac{35 \text{ cm}}{100} = 0,35 \text{ m}$ ✓✓; $\frac{2,625}{0,35} = 7,5 \text{ tiles}$ ✓✓
- 4. 1,569 m, ✓ 1578 mm, ✓ 158 cm, ✓ 0,001582 km ✓

Worksheet 2 Length and distance: calculations

- 1. $\frac{185 \text{ cm}}{100} = 1,85 \text{ m}$; $1,85 \times \text{R}10,95 = \text{R}20,2575 = \text{R}20,26$ ✓✓✓✓
- 2. $\frac{10000}{400} = 25 \text{ times}$ ✓✓✓
- 3. $(7,5 \text{ km} \times 2) \times 5 = 75 \text{ km}$; $457 - 75 = 382 \text{ km}$ ✓✓✓✓✓

- 4.1 $\frac{0,625 \text{ m}}{0,125 \text{ m}} = 5$; $\frac{0,3}{0,075} = 4$; $5 \times 4 = 20$ cell phones ✓✓
- 4.2 $20 \times 10 = 200$; $200 \times \text{R}13\,999 = \text{R}2\,799\,800$ ✓✓
5. $55 \text{ L} \times 3 = 165 \text{ L}$; $\frac{165}{13} = 12,69$ (times 100 km) = 1 269 km ✓✓✓✓
- 6.1 $\frac{350\,000 \text{ mm}}{1\,000\,000} = 0,35 \text{ km}$; $\frac{365 \text{ m}}{1\,000} = 0,365 \text{ km}$; $\frac{45\,000 \text{ cm}}{100\,000} = 0,45 \text{ km}$; $0,35 + 0,365 + 0,45 + 6,7 = 7,865 \text{ km}$ ✓✓✓✓✓✓
- 6.2 $12\,349 + 7,865 = 12\,356,865 \text{ km}$ ✓✓✓
- 6.3 $\frac{5\,250 \text{ m}}{1\,000} = 5,25 \text{ km}$; $\frac{300\,000 \text{ cm}}{100\,000} = 3,0 \text{ km}$; $3,0 + 5,25 = 8,25 \text{ km}$; $8,25 \times \text{R}1\,750 = \text{R}14\,437,50$ ✓✓✓✓✓✓
7. $12,265 \text{ km} \times 1\,000 = 12\,265 \text{ m}$; $12\,265 \times \text{R}15,25 = \text{R}187\,041,25$ ✓✓✓
- 8.1 $\frac{250}{10} = 25$ tables ✓✓✓
- 8.2 $4 \times 50 \text{ cm} = 200 \text{ cm}$ ✓✓✓
- 8.3 $\frac{200 \text{ cm}}{100} = 2 \text{ m} + 1 = 3 \text{ m}$; $\frac{21 \text{ m}}{3} = 7$ tables per row ✓✓✓
- 8.4 $\frac{25}{7} = 3,57 \approx 4$ rows ✓✓✓

Worksheet 3 Mass: units, conversion and calculations

- 1.1 g ✓
- 1.2 kg ✓
- 1.3 kg ✓
- 1.4 t ✓
- 1.5 g ✓
- 1.6 t ✓
- 1.7 kg ✓
- 1.8 kg ✓
- 1.9 g ✓
- 1.10 g ✓
- 1.11 kg ✓
- 1.12 t ✓
- 1.13 t ✓
- 1.14 g ✓
- 1.15 g ✓
- 1.16 kg ✓
- 1.17 kg ✓
- 1.18 t ✓
- 1.19 g ✓
- 1.20 g ✓
- 2.1 $\frac{5\,000 \text{ g}}{1\,000} = 5 \text{ kg}$ ✓✓
- 2.2 $\frac{7\,500 \text{ kg}}{1\,000} = 7,5 \text{ t}$ ✓✓
- 2.3 $12 \text{ kg} \times 1\,000 = 12\,000 \text{ g}$ ✓✓
- 2.4 $2,2 \text{ t} \times 1\,000 = 2\,200 \text{ kg}$ ✓✓
- 2.5 $0,00045 \times 1\,000\,000 = 450 \text{ g}$ ✓✓
- 2.6 $\frac{15 \text{ g}}{1\,000\,000} = 0,000015 \text{ t}$ ✓✓
- 3.1 $156 \text{ g} \times 12 = 1\,872 \text{ g}$; $\frac{1\,872 \text{ g}}{1\,000} = 1,872 \text{ kg}$ ✓✓✓
- 3.2 $15 \text{ kg} \times 10 = 150 \text{ kg}$; $150 \text{ kg} \times 1\,000 = 150\,000 \text{ g}$ ✓✓✓
- 3.3 $\frac{0,039}{25} = 0,00156$; $0,00156 \times 100 = 0,156 \text{ t}$; $0,156 \text{ t} \times 1\,000 = 156 \text{ kg}$ ✓✓✓
- 3.4 $0,3 \text{ kg} \times 1\,000 = 300 \text{ g}$; $\frac{300 \text{ g}}{15} = 20 \text{ g}$ ✓✓✓
- 3.5 $0,023 \times 1\,000 = 23 \text{ kg}$ ✓✓✓
- 3.6 $68 \text{ kg} + 51 \text{ kg} + 63 \text{ kg} + 81 \text{ kg} + 71 \text{ kg} = 334 \text{ kg}$; $\frac{334 \text{ kg}}{1\,000} = 0,334 \text{ t}$ ✓✓✓

- 4.1 $0,75 \text{ kg} \times 720 = 540 \text{ kg}$ ✓✓
 4.2 $10 \text{ t} + 2(10) = 30 \text{ t}$ ✓✓✓
 4.3 $0,85 \text{ kg} \times 10 = 8,5 \text{ kg}$ ✓✓
 4.4 $1,2 \text{ kg} \times 1\,000 = 1\,200 \text{ g}$ ✓✓
 4.5 $1,678 \text{ g} \times 500 = 839 \text{ g}$ ✓✓
 4.6 $\frac{355 \text{ g}}{1\,000} = 0,355 \text{ kg}$; $0,355 \text{ kg} \times 7 = 2,485 \text{ kg}$ ✓✓✓✓

Worksheet 4 Mass: calculations and problem solving

- 1.1 $15 \times 1\,000 = 15\,000 \text{ g}$; $\frac{15\,000}{125} = 120 \text{ g}$ ✓✓✓✓
 1.2 $\frac{4\,500 \text{ kg}}{1\,000} = 4,5 \text{ t}$; $\frac{1\,800}{4,5 \text{ t}} = 400 \text{ containers}$ ✓✓✓✓
 1.3 $15\,000 \times \frac{3}{4} = 11\,250 \text{ kg}$ ✓✓✓✓
 1.4 $89,95 \times \frac{275}{1\,000} = \text{R}24,74$ ✓✓✓✓
 1.5 $\frac{2\,350 \text{ g}}{1\,000} = 2,36 \times \text{R}32,99 = \text{R}77,86$ ✓✓✓✓
 1.6 $50 \text{ t} \times 1\,000 = 50\,000 \text{ kg}$; $\frac{50\,000}{50} = 1\,000 \text{ bags}$ ✓✓✓✓
 1.7 $20 \text{ kg} \times 1\,000 = 20\,000 \text{ g}$; $\frac{20\,000}{80} = 250 \text{ g}$ ✓✓✓✓
 1.8 $25 \text{ kg} \times 1\,000 = 25\,000 \text{ g}$; $\frac{25\,000}{6\,250} = 4 \text{ g}$; $63 \times 4 = 252 \text{ g}$ ✓✓✓✓
 1.9 $\frac{384,40}{89,99} = 4,27 \text{ kg}$ ✓✓✓✓
 1.10 $45 \text{ g} - 6,5 \text{ g} = 38,5 \text{ g}$; $\frac{38,5}{100} = 0,385 \text{ g}$ ✓✓✓✓
 1.11 $\frac{60}{12} = 5$; $5 \times 250 \text{ g} = 1\,250 \text{ g}$ ✓✓✓✓
 1.12 $\frac{2\,700 \text{ g}}{150} = 18 \text{ bags needed}$; $18 \times \text{R}6,95 = \text{R}125,10$ ✓✓✓✓
 2.1 $2 \text{ t} \times 1\,000 = 2\,000 \text{ kg}$; $\frac{2\,000}{15} = 133,33 \approx 133 \text{ boxes}$ ✓✓✓✓
 2.2 $\frac{1\,250}{133} = 9,40 \approx 10 \text{ trips}$ ✓✓✓
 3. $100\% - 27\% = 73\%$; $\frac{18,5}{73} \times 100 = 0,2534 \times 100 = 25,34 \text{ kg}$ ✓✓✓✓
 4. $\frac{4\,500 \text{ g}}{1\,000} = 4,5 \text{ kg}$; $0,00535 \times 1\,000 = 5,35 \text{ kg}$; $4,5 + 6 + 5,35 = 15,85 \text{ kg}$ ✓✓✓✓✓✓
 5. $\frac{112,5}{12,5} \times 100 \text{ g} = 9 \times 100 \text{ g} = 900 \text{ g}$ ✓✓✓
 6.1 $0,8 \text{ kg} + (\frac{425 \text{ g}}{1\,000}) + (0,000015 \times 1\,000) = 0,8 + 0,425 + 0,015 = 1,24 \text{ kg}$ ✓✓✓✓✓
 6.2 $\frac{7}{0,425} = 16,47 \approx 16 \text{ times}$ ✓✓✓
 7. $2 \times 150 = 300 \text{ kg}$; $\frac{300}{50} = 6 \text{ bags}$ ✓✓✓✓
 8. $\frac{\text{R}416,50}{49} = 8,5 \text{ kg}$ ✓✓✓✓

Worksheet 5 Volume: units, conversion and calculations

- 1.1 L ✓
 1.2 L ✓
 1.3 mL ✓
 1.4 mL ✓
 1.5 mL ✓
 1.6 kL ✓
 1.7 mL ✓
 1.8 kL ✓
 1.9 kL ✓

- 1.10 mL ✓
 1.11 mL ✓
 1.12 mL ✓
 1.13 L ✓
 1.14 kL ✓
 1.15 mL ✓
 1.16 kL ✓
 1.17 kL (L) ✓
 1.18 L ✓
 1.19 kL ✓
 1.20 mL (L) ✓
- 2.1 $\frac{2\,000\text{ mL}}{1\,000} = 2\text{ L milk}$ ✓✓
 2.2 $4\text{ kL} \times 1\,000 = 4\,000\text{ L}$ ✓✓
 2.3 $4\text{ L} \times 1\,000 = 4\,000\text{ mL}$ ✓✓
 2.4 $\frac{14\,000\text{ L}}{1\,000} = 14\text{ kL}$ ✓✓
 2.5 $\frac{240\,000\,000\text{ mL}}{1\,000\,000} = 240\text{ kL}$ ✓✓
 2.6 $10\text{ kL} \times 1\,000\,000 = 10\,000\,000\text{ mL}$ ✓✓
 2.7 $\frac{120\text{ mL}}{1\,000} = 0,12\text{ L}$ ✓✓
 2.8 $2\text{ L} \times 1\,000 = 2\,000\text{ mL}$ ✓✓
 2.9 $1,75\text{ L} \times 1\,000 = 1\,750\text{ mL}$ ✓✓
 2.10 $2,39\text{ kL} \times 1\,000\,000 = 2\,390\,000\text{ mL}$ ✓✓
- 3.1 $0,6\text{ L} \times 4 = 2,4\text{ L}$; $2,4\text{ L} \times 1\,000 = 2\,400\text{ mL}$ ✓✓
 Or, $0,6\text{ L} \times 1\,000 = 600\text{ mL}$; $600\text{ mL} \times 4 = 2\,400\text{ mL}$ ✓✓
 3.2 $350\text{ mL} \times 4 = 1\,400\text{ mL}$; $\frac{1\,400\text{ mL}}{1\,000} = 1,4\text{ L}$ ✓✓
 3.3 $2\text{ kL} \times 1\,000\,000 = 2\,000\,000\text{ mL}$; $\frac{2\,000\,000\text{ mL}}{4\,000} = 500\text{ mL}$ ✓✓
 3.4 $250\text{ mL} \times 25 = 6\,250\text{ mL}$; $\frac{6\,250\text{ mL}}{1\,000} = 6,25\text{ L}$ ✓✓
 3.5 $15 + 60 = 75\text{ L}$; $\frac{75\text{ L}}{1\,000} = 0,075\text{ kL}$ ✓✓
 3.6 $45\text{ L} \times \frac{10}{100} = 4,5\text{ L}$; $4,5\text{ L} \times 1\,000 = 4\,500\text{ mL}$ ✓✓
- 4.1 $\frac{40\,000\text{ mL}}{1\,000} = 40\text{ L}$; $\frac{40}{5} = 8\text{ buckets}$ ✓✓✓
 4.2 $4 \times 250\text{ mL} = 1\,000\text{ mL}$; $\frac{3\,000\text{ mL}}{1\,000} = 3\text{ teapots}$ ✓✓✓
 4.3 $5,25\text{ kL} \times 1\,000\,000 = 5\,250\,000\text{ mL}$ ✓✓✓
 4.4 $\frac{5\,250\,000}{1\,000} = 5\,250\text{ 1-litre bottles}$ ✓✓✓
 Or, $5,25\text{ kL} \times 1\,000 = 5\,250\text{ 1-litre bottles}$ ✓✓✓

Worksheet 6 Volume: complex problems

- 1.1 $12 \times 60 = 720\text{ km}$ ✓✓
 1.2 $\frac{2\,160}{720} = 3\text{ tanks}$ ✓✓
 1.3 $\frac{360}{720} = \frac{1}{2}$; $60 \times \frac{1}{2} = 30\text{ L}$ ✓✓✓
 1.4 $60\text{ L} \times \frac{10}{100} = 6\text{ L}$; $60 - 6 = 54\text{ L}$ ✓✓✓
 1.5 $54 \times R12,89 = R696,06$ ✓✓
- 2.1 $38\text{ kL} \times 1\,000 = 38\,000\text{ L}$; $38\,000 \times 0,5\% = 38\,000 \times \frac{0,5}{100} = 190\text{ L}$ ✓✓✓
 2.2 $38\text{ kL} \times 83\% = 38\text{ kL} \times \frac{83}{100} = 31,54\text{ kL}$ ✓✓✓
 2.3 $38 - 31,54 = 6,46\text{ kL}$; $6,46\text{ kL} \times 1\,000 = 6\,460\text{ L}$; $\frac{6\,460}{190} = 34\text{ weeks}$ ✓✓✓✓

- 3.1 $20 \text{ L} \times 1\,000 = 20\,000 \text{ mL}$; $\frac{20\,000}{250} = 80 \text{ cups}$ ✓✓✓
- 3.2 $\frac{1}{2} \times 250 = 125 \text{ mL}$; $125 \times 24 = 3\,000 \text{ mL}$; $\frac{3\,000}{1\,000} = 3 \text{ L}$; $20 - 3 = 17 \text{ L}$ ✓✓✓✓
- 3.3 $\frac{20\,000}{750} = 26,67 \approx 27 \text{ buckets}$ ✓✓✓
- 3.4 $400 \times 250 = 100\,000 \text{ mL}$; $\frac{100\,000}{1\,000} = 100 \text{ L}$; $\frac{100}{20} = 5 \text{ times}$ ✓✓✓
- 4.1 $350 \times 50 = 17\,500 \text{ mL}$ ✓✓✓✓
- 4.2 $350 \times 3 \text{ m}^2 = 1\,050 \text{ m}^2$ ✓✓✓
- 4.3 75 L needed: $(3 \times 20 \text{ L}) + (3 \times 5 \text{ L}) = 60 \text{ L} + 15 \text{ L} = 75 \text{ L}$; So, buy $3 \times 20 \text{ L}$ and $3 \times 5 \text{ L}$ ✓✓✓✓
- 4.4 $(3 \times 457,15) + (3 \times 149,65) = 1\,371,45 + 448,95 = \text{R}1\,820,40$ ✓✓✓✓
- 5.1 $5 \text{ kL} \times 50\% = 5 \text{ kL} \times \frac{50}{100} = 2,5 \text{ kL}$; $2,5 + 5 = 7,5 \text{ kL}$ ✓✓✓
- 5.2 $5 \times 180 = 900 \text{ kL}$; $7,5 \times 185 \text{ kL} = 1\,387,50$; $900 + 1\,387,50 = 2\,287,50 \text{ kL}$ ✓✓
- 5.3 $\frac{2\,287,50 \text{ kL}}{20\,000} \times 100 = 11,44\%$ ✓✓✓
- 5.4 $20\,000 \text{ kL} \times 7\% = 20\,000 \times \frac{7}{100} = 1\,400 \text{ kL}$ ✓✓✓

Worksheet 7 Temperature: reading and conversion

- 1.1 Kitchen thermometer ✓
- 1.2 Thermometer ✓
- 1.3 Digital medical thermometer ✓
- 1.4 Oven thermometer ✓
- 2.1 37°C ✓✓
- 2.2 11°C ✓✓
- 3.1 20°C ✓✓
- 3.2 31°C ✓✓
- 3.3 10°C ✓✓
- 4.1.1 10°C ✓
- 4.1.2 15°C ✓
- 4.1.3 17°C ✓
- 4.2.1 34°C ✓
- 4.2.2 34°C ✓
- 4.2.3 38°C ✓
- 4.3 Monday ✓✓
- 4.4 Sunday ✓✓
- 4.5 No; too cold, coldest day of this week, much warmer temperatures on the weekend ✓✓✓
- 4.6 Friday, Saturday, Sunday ✓✓✓
- 5.1 $20 + (2 \times 30) = 20 + 60 = 80^\circ\text{C}$ ✓✓✓
- 5.2 $7 - (-5) = 7 + 5 = 12^\circ\text{C}$ ✓✓

Worksheet 8 Time: formats and calculations

- 1.1 Analogue ✓
- 1.2 11:49 (11:50) ✓
- 1.3 11:49 (11:50) ✓
- 1.4 $11:49 + 17 \text{ minutes} = 11:00 + 00:49 + 00:17 = 11:00 + 00:66 = 12:00 + 0:06 = 12:06$ ✓
- 1.5 $11:49 + 2 \text{ hours } 34 \text{ minutes} = 13:00 + 0:83 = 14:00 + 0:23 = 14:23$ ✓
- 2.1 A, D, E ✓✓
- 2.2 07:59 ✓✓
- 2.3 B, C, F, G ✓✓
- 2.4 $00:15 + 04:34 = 04:49$, so E ✓✓
- 2.5 $12:15 - 04:49 = (12 - 04) \text{ hours} + (15 - 49) \text{ mins} = 8 \text{ hours} + (-34 \text{ mins}) = 7 \text{ hours } 26 \text{ minutes}$ ✓✓

- 2.6 $510 \text{ minutes} = \frac{510}{60} \text{ hours} = 8 \text{ hours } 30 \text{ minutes}; 10:00 + 08:30 = 18:30, \text{ so C } \checkmark\checkmark$
- 2.7 $12:15 - 0:15 = 12 \text{ hours (B is just after noon; D is just after midnight)} \checkmark\checkmark$
- 3.1 2 hours, 27 minutes, 15 seconds $\checkmark\checkmark\checkmark$
- 3.2 $2:27:15 - 0:0:37 = 2:26:38 \checkmark\checkmark\checkmark$
- 3.3 $2:27:15 + 0:35:53 = 3:03:08 \checkmark\checkmark\checkmark$
- 3.4 $(3 \times 60) + 3 = 180 + 3 = 183 \text{ minutes (you may ignore the 8 seconds)} \checkmark\checkmark\checkmark$
- 4.1 $1,5 + 11 + 0,5 = 13 \text{ hours } \checkmark\checkmark\checkmark\checkmark$
- 4.2 $\frac{72}{24} = 3 \text{ days } \checkmark\checkmark$
- 4.3 $(4 \times 2) \times 11 = 8 \times 11 = 88 \text{ hours } \checkmark\checkmark\checkmark\checkmark$
5. $\frac{55}{5} = 11 \text{ weeks } \checkmark\checkmark$
6. $\frac{36}{7} = 5,14 \text{ weeks } \checkmark$

Worksheet 9 Time: conversion, schedules and calendars

- 1.1 $31 \times 60 = 1\,860 \text{ seconds } \checkmark$
- 1.2 $49,5 \times 60 = 2\,970 \text{ seconds } \checkmark$
- 1.3 $\frac{425}{60} = 7,08 \text{ hours } \approx 7 \text{ hours } \checkmark$
(or $7 \times 60 = 420 \text{ minutes}, 425 - 420 = 5 \text{ minutes}, \text{ so } 7 \text{ hours } 5 \text{ minutes } \checkmark$)
- 1.4 $\frac{1\,250}{60} = 20 \text{ hours}; 1\,250 - (20 \times 60) = 1\,250 - 1\,200 = 50 \text{ minutes}, \text{ so } 20 \text{ hours and } 50 \text{ minutes } \checkmark$
- 1.5 $\frac{288}{24} = 12 \text{ days } \checkmark$
- 1.6 $3 \times 60 \times 60 \times 24 = 259\,200 \text{ seconds } \checkmark$
- 1.7 $\frac{89}{24} = 3; 24 \times 3 = 72; 89 - 72 = 17 \text{ hours}, \text{ so } 3 \text{ days and } 17 \text{ hours } \checkmark$
- 1.8 $\frac{248}{60} = 4 \text{ hours}; 4 \times 60 = 240; 248 - 240 = 8 \text{ minutes}, \text{ so } 4 \text{ hours and } 8 \text{ minutes } \checkmark$
- 2.1 11:00 \checkmark
- 2.2 No; Her appointment ends at 17:00. It is a 25-minute drive to the movies. She will arrive at 17:25 at the earliest. She will be at least 10 minutes late. $\checkmark\checkmark\checkmark$
- 2.3 No \checkmark
- 2.4 Lunch $\checkmark\checkmark$
- 2.5 Yes; Hands at 15:00, followed by facial at 16:00. $\checkmark\checkmark\checkmark$
- 3.1 13 Saturdays \checkmark
- 3.2 4 Mondays $\checkmark\checkmark$
- 3.3 4 weeks $\checkmark\checkmark$
- 3.4 February only has 28 days so it fits in 4 weeks with 7 days per week. $\checkmark\checkmark$
- 3.5 $28 + 31 + 30 = 89; \frac{89}{11} = 8,09 \approx 8 \text{ days } \checkmark\checkmark\checkmark\checkmark$
- 3.6 April $\checkmark\checkmark$
- 3.7 5 weeks and 3 days $\checkmark\checkmark$
- 3.8 Saturday $\checkmark\checkmark$
- 3.9 $30 \times 24 = 720 \text{ hours } \checkmark\checkmark\checkmark$
- 3.10 1 April $\checkmark\checkmark$

Exam-type questions

- 1.1 $0,8 \text{ kg} + \left(\frac{650 \text{ g}}{1\,000}\right) + \left(\frac{900 \text{ g}}{1\,000}\right) = 0,8 + 0,65 + 0,9 = 2,35 \text{ kg } \checkmark\checkmark\checkmark$
- 1.2 No. $900 \text{ g} = 0,9 \text{ kg}$ butter needed. One $0,5 \text{ kg}$ block will be $(0,9 - 0,5 = 0,4 \text{ kg})$ too little. $\checkmark\checkmark\checkmark$
- 2.1 September (30) + October (31) + November (30) + December (20) = 111 days $\checkmark\checkmark\checkmark$
- 2.2 Yes; $(3 \times 4) + 3 = 15; 15 \times 1\,000 = \text{R}15\,000 \checkmark\checkmark\checkmark\checkmark$

- 2.3 $1,65 \text{ t} \times 1\,000 = 1\,650 \text{ kg}$; $\frac{65\,367 \text{ g}}{1\,000} = 65,367 \text{ kg}$; $1\,650 + 267 + 65,367 = 1\,982,37 \text{ kg}$ ✓✓✓✓
 Or $\frac{267 \text{ kg}}{1\,000} = 0,267 \text{ t}$; $\frac{65\,367 \text{ g}}{1\,000\,000} = 0,065367 \text{ t}$; $1,65 + 0,267 + 0,065367 = 1,98237 \text{ t} \approx 1,98 \text{ t}$ ✓✓✓✓
 (Units of answer are not specified - you may use kg or t.)
- 2.4 $100\% - 31\% = 69\%$; $910 \text{ km} \times 69\% = 910 \times \frac{69}{100} = 627,9 \text{ km}$ ✓✓✓
- 2.5 $\frac{910}{10,5} = 86,67 \text{ L}$ fuel needed for the whole trip; $86,67 - 15 = 71,67 \text{ L}$ still needed;
 fuel tank capacity is $0,06 \times 1\,000 = 60 \text{ L}$ capacity; $\frac{71,67}{60} = 1,1945$ so 2 tanks are needed i.e. they need to fill up twice. ✓✓✓
- 2.6 $R124,95 + (60 \times 12,17) = 124,95 + 730,20 = R855,15$ ✓✓✓✓
- 2.7 $\frac{261}{98} = 2,66$ hours; 2 hours and $0,66 \times 60 = 39,6$ min; 2 hours and 39,6 minutes ✓✓✓✓
 Or, $\frac{261}{98} = 2,66$ hours; $2,66 \text{ hours} \times 60 = 159,6$ minutes = 2 hours and 39,6 minutes ✓✓✓✓
- 3.1 $\frac{13\,776}{24} = 574$ days; $\frac{574}{7} = 82$ weeks ✓✓✓
- 3.2 $\frac{3\,750}{1\,000} = 3,75 \text{ L}$; $103 \times 3,75 = 386,25 \text{ L}$ per day ✓✓✓
- 3.3 $3 \text{ kL} \times 1\,000 = 3\,000 \text{ L}$; $\frac{3\,000}{386,25} = 7,77$ days ✓✓
- 3.4 $386,25 \text{ L} \times \frac{45}{100} = 173,81 \text{ L}$; $173,81 + 386,25 = 560,06 \text{ L}$ ✓✓✓✓
- 3.5 $\frac{5\,200 \text{ cm}}{100} = 52 \text{ m}$; $\frac{10\,000 \text{ mm}}{1\,000} = 10 \text{ m}$; $52 + 10 + 10 = 72 \text{ m}$ ✓✓✓
- 3.6 $85 \text{ kg} \times 103 = 8\,755 \text{ kg}$;
 $\frac{8\,755 \text{ kg}}{1\,000} = 8,755 \approx 8,76 \text{ t}$ ✓✓✓
 (Answer may be given in kilograms or tonnes, as it is not specified.)
- 3.7 $\frac{137}{45} = 3,0444$ hours; 3 hours and $(0,0444 \times 60) = 2,666$ minutes ✓✓
- 4.1 $84,25 \times 20 = 1\,685 \text{ km}$ ✓✓✓
- 4.2 $\frac{1\,685}{125} = 13,48$ days ✓✓✓
- 4.3 $\frac{125}{20} = 6,25 \text{ km}$ ✓✓
- 4.4 $\frac{92 \text{ cm}}{100\,000} = 0,00092 \text{ km}$; $\frac{7}{0,00092} = 7\,608,70$ steps ✓✓✓
 Or $7 \text{ km} \times 100\,000 = 700\,000 \text{ cm}$; $\frac{700\,000}{92} = 7\,608,70$ steps ✓✓✓
- 4.5 $\frac{760 \text{ mm}}{1\,000\,000} = 0,00076 \text{ km}$; $\frac{7}{0,00076} = 9\,210,53$; $9\,210,53 - 7\,608,70 = 1\,601,83$ more steps ✓✓✓✓
 Or $\frac{760 \text{ mm}}{10} = 76 \text{ cm}$; $\frac{700\,000}{76} = 9\,210,53$; $9\,210,53 - 7\,608,70 = 1\,601,83$ more steps ✓✓✓✓
5. $\frac{R249,99}{100} = R2,4999/\text{mL}$;
 $\frac{R157,50}{50} = R3,15/\text{mL}$;
 so, the price R249,99 for 100 mL is more economical. ✓✓✓✓
- 6.1 $123\,400\,000 \times 1,83\% = 2\,258\,220 \text{ L}$
 (This is 2 258,22 kL, no unit specified.) ✓✓✓
- 6.2 $10\,000 \text{ kL} \times 1\,000 = 10\,000\,000 \text{ L}$; $\frac{10\,000\,000}{2\,258\,220} = 4,43$ days ✓✓✓
- 6.3 $\frac{150\,000\,000 \text{ mL}}{1\,000\,000} = 150 \text{ kL}$; $\frac{150}{2,5} = 60$ minutes ✓✓✓✓
- 6.4 $\frac{123\,400}{10} = 12\,340$ seconds; $\frac{12\,340}{60} = 205,67$ minutes; $12\,340 - (205 \times 60) = 40$
 So, 205 minutes and 40 seconds ✓✓✓✓
- 7.1 $1\,250 \times 1\,000 = 1\,250\,000 \text{ kg}$; $\frac{1\,250\,000 \text{ kg}}{1\,000} = 1\,250 \text{ t}$ ✓✓
- 7.2 $3\,750 - 1\,250 = 2\,500 \text{ t}$; $\frac{2\,500}{1\,000} = 2,5 \text{ t}$ ✓✓✓
- 7.3 $4,5 \text{ kL} \times 1\,000 = 4\,500 \text{ L}$; $\frac{R1\,282\,500}{4\,500} = R285$ ✓✓✓

8. $3 + 7 = 10$; $\frac{3}{10} \times 500 = 150$ mL concentrate; $\frac{7}{10} \times 500 = 350$ mL water ✓✓✓✓✓
- 9.1 $6 \times 4 = 24$ weeks ✓✓
- 9.2 $3\ 114 + 1\ 181 = 4\ 295$; $4\ 295 \times 90 = 386\ 550$ kg (= 386,55 t) ✓✓
- 9.3 $138\ 000\ 000$ kg - $386\ 550$ kg = $137\ 613\ 450$ kg = $137\ 613,450$ t ✓✓✓
- 9.4 $7 + 10 = 17$ hours ✓✓
- 9.5 $\frac{450}{17} = 26,67$ km/h ✓✓
- 9.6 $19:00 - 10:00 = 9$ hours ✓✓
- 9.7 Sunday 10 July ✓✓
- 9.8 Sunday 3 July at 05:49 ✓✓✓
- 9.9 $17:00 - 3:30 = 13:30$ So boarding starts at 13:30.
 $13.30 - 8:00 = 5$ hours and 30 minutes to travel to the cruise terminal ✓✓✓
- 10.1 Thursday ✓✓
- 10.2 31 August ✓✓
- 10.3 $20 - 7 = 13$ °C ✓✓✓
- 10.4 12 days ✓✓✓
- 10.5 Winter; daily temperatures are generally low ✓✓✓
- 10.6 $9 - 14 = -5$ °C ✓✓✓
- 10.7 Saturday 27 August ✓✓
- 10.8 10 August to 25 August is 15 days. So, sunrise would be 15 minutes earlier.
 $07:37 - 0:15 = 07:22$ sunrise on 25 August ✓✓✓

Solutions: Topic 2 – Interest

Worksheet 1 Simple interest: interest and final amount

1. Interest for 1 year: $\frac{12}{100} \times R35\,000 = R4\,200$
Interest for 6 years: $R4\,200 \times 6 = R25\,200$ ✓✓✓✓
2. Interest for 1 year: $\frac{5,5}{100} \times R250 = R13,75$
The correct answer is C. $R13,75$ ✓✓
3. Interest for 1 year: $\frac{2,5}{100} \times R12\,167 = R304,18$
Interest for 5 years: $R304,18 \times 5 = R1\,520,88$
The correct answer is D. $R1\,520,88$ ✓✓
4. Interest for 1 year: $\frac{7,5}{100} \times R100 = R7,50$
Interest for 12 years: $R7,50 \times 12 = R90$ ✓✓✓✓
5. Interest for 1 year: $\frac{8,5}{100} \times R10\,000 = R850$
Interest for 1,5 years: $R850 \times 1,5 = R1\,275$
(Interest rate is per year, so convert months to years i.e. 18 months = $\frac{18}{12}$ years = 1,5 years) ✓✓✓✓
- 6.1 Interest for 1 year: $\frac{7}{100} \times R20\,000 = R1\,400$
Total amount at the end of 1 year = $R20\,000 + R1\,400 = R21\,400$ ✓✓
- 6.2 Interest for 1,5 years: $R1\,400 \times 1,5 = R2\,100$
Total amount at the end of 1,5 years = $R20\,000 + R2\,100 = R22\,100$ ✓✓
7. Interest for 1 year: $\frac{13}{100} \times R8\,000 = R1\,040$
Interest for 4,5 years: $R1\,040 \times 4,5 = R4\,680$
Value of the investment at the end of 4,5 years = $R8\,000 + R4\,680 = R12\,680$ ✓✓✓✓✓
8. Interest for 1 year: $\frac{14,5}{100} \times R6\,000 = R870$
Interest for 5 years: $R870 \times 5 = R4\,350$
Value of the investment at the end of 5 years = $R6\,000 + R4\,350 = R10\,350$ ✓✓✓✓
Interest for 1 year: $\frac{12}{100} \times R10\,350 = R1\,242$
Interest for 2 years 9 months (2,75 years): $R1\,242 \times 2,75 = R3\,415,50$
Value of the investment at the end of 7 years and 9 months = $R10\,350 + R3\,415,50 = R13\,765,50$ ✓✓✓✓
- 9.1 Interest for 1 year: $\frac{7,5}{100} \times R1\,200 = R90$
Interest for 3 years: $R90 \times 3 = R270$ ✓✓
- 9.2 Interest for 1 year: $\frac{9,25}{100} \times R750 = R69,38$
Interest for 2 years: $R69,38 \times 2 = R138,76$ ✓✓
10. Interest for 1 year: $\frac{7,5}{100} \times R8\,000 = R600$
3 months = $\frac{3}{12}$ year = $\frac{1}{4}$ year
Interest for 3 months = $600 \times \frac{1}{4} = R150$ ✓✓✓✓

Worksheet 2 Simple interest: initial amount, period and interest rate

1. Let the amount invested be Rx .
Interest for 1 year: $\frac{6}{100} \times x = R0,06x$
Interest for 2 years: $R0,06x \times 2 = R0,12x$
Total interest = $R750$

$$\therefore 0,12x = R750 \text{ (Divide both sides of the equation by } 0,12.)$$

$$\therefore x = R6\,250$$

The correct answer is B. R6 250 ✓✓

2. Total interest for 3 years = R75

$$\therefore \text{Interest for 1 year: } \frac{75}{3} = R25$$

$$\text{Interest rate} = [\text{Interest for 1 year/Initial amount}] \times 100 = \frac{25}{450} \times 100 = 5,6\%$$

The correct answer is B. 5,6% ✓✓

3. Let the amount invested be Rx.

$$\text{Interest for 1 year: } \frac{13}{100} \times x = R0,13x$$

$$\text{Interest for 5 years: } R0,13x \times 5 = 0,65x$$

$$\text{Amount invested} + \text{Interest for 5 years} = x + 0,65x = R16\,500$$

$$\therefore 1,65x = 16\,500 \text{ (Divide both sides of the equation by } 1,65.)$$

$$\therefore x = R10\,000 \text{ so James should invest } R10\,000. \checkmark\checkmark\checkmark\checkmark\checkmark$$

4. Let the amount invested be Rx.

$$\text{Interest for 1 year: } \frac{12}{100} \times x = R0,12x$$

$$30 \text{ months} = \frac{30}{12} \text{ years} = 2,5 \text{ years}$$

$$\text{Interest for 30 months: } R0,12x \times 2,5 = 0,3x$$

$$\text{Amount invested} + \text{Interest for 2,5 years} = x + 0,3x = R5\,000$$

$$\therefore 1,3x = 5\,000 \text{ (Divide both sides of the equation by } 1,3.)$$

$$\therefore x = R3\,846,15 \text{ so Siphso should invest } R3\,846,15. \checkmark\checkmark\checkmark\checkmark\checkmark$$

5. Initial amount = R3 000; interest rate = 10% p.a.

$$\text{Interest for 1 year: } \frac{10}{100} \times 3\,000 = R300$$

$$\text{Total amount of interest earned} = R1\,000$$

$$\text{Number of years} = [\text{Total interest/Interest for 1 year}] = \frac{1\,000}{300} = \frac{10}{3} \text{ years} = 3,33 \text{ years } \checkmark\checkmark\checkmark$$

6. Initial amount = R5 000; interest rate = 5% p.a.

$$\text{Interest for 1 year: } \frac{5}{100} \times 5\,000 = R250$$

$$\text{Total amount of interest paid} = R500$$

$$\text{Number of years} = [\text{Total interest/Interest for 1 year}] = \frac{500}{250} = 2 \text{ years } \checkmark\checkmark\checkmark$$

7. Initial amount = R200; period = 7 years; final amount = $(3 \times R200) = R600$;

$$\text{Total interest for 7 years} = R600 - R200 = R400$$

$$\text{Interest for 1 year: } \frac{400}{7} = R57,14$$

$$\text{Rate} = [\text{Interest for 1 year/Initial amount}] \times 100 = \frac{57,14}{200} \times 100 = 28,57\% \checkmark\checkmark\checkmark\checkmark\checkmark$$

8. Initial amount = R10 000; period = 3 years; final amount = R13 600;

$$\text{Total interest for 3 years} = R3\,600$$

$$\text{Interest for 1 year: } \frac{3\,600}{3} = R1\,200$$

$$\text{Rate} = [\text{Interest for 1 year/Initial amount}] \times 100 = \frac{1\,200}{10\,000} \times 100 = 12\% \checkmark\checkmark\checkmark\checkmark\checkmark$$

Worksheet 3 Simple interest: further questions

1. Let the principal amount be Rx.

$$\text{Interest for 1 year: } \frac{6,25}{100} \times x = R0,0625x$$

$$\text{Interest for 3 years: } R0,0625x \times 3 = R0,1875x$$

$$\text{Principal amount} + \text{Interest for 3 years} = x + 0,1875x = R37\,087,50$$

$$\therefore 1,1875x = R37\,087,50 \text{ (Divide both sides of the equation by } 1,1875.)$$

$$\therefore x = R31\,231,58$$

The correct answer is A. R31 231,58 ✓✓

2. Period: 1 April–31 December = 9 months = $\frac{9}{12}$ years = 0,75 years
 Interest rate = 9,5% p.a.
 Let the amount invested be Rx.
 Interest for 1 year: $\frac{9,5}{100} \times x = R0,095x$
 Interest 0,75 years: $R0,095x \times 0,75 = R0,07125x$
 Amount invested + Interest for 0,75 years = $x + 0,07125x = R1\ 000$
 $\therefore 1,07125x = 1\ 000$ (Divide both sides of the equation by 1,07125.)
 $\therefore x = R933,49$ so R933,49 should be invested. ✓✓✓✓✓✓
3. Initial amount = R450; final amount = R531; interest rate = 4,5% p.a.
 Interest for 1 year: $\frac{4,5}{100} \times 450 = R20,25$
 Total amount of interest earned = $R531 - R450 = R81$
 Number of years = [Total interest/Interest for 1 year] = $\frac{81}{20,25} = 4$ years ✓✓✓✓
4. Initial amount = R500; final amount = ($2 \times R500 = R1\ 000$); interest rate = 12,5% p.a.
 Interest for 1 year: $\frac{12,5}{100} \times 500 = R62,50$
 Total amount of interest earned = $R1\ 000 - R500 = R500$
 Number of years = [Total interest/Interest for 1 year] = $\frac{500}{62,50} = 8$ years ✓✓✓✓
5. Initial amount = R800; final amount = R2 000); interest rate = 17,6% p.a.
 Interest for 1 year: $\frac{17,6}{100} \times 800 = R140,80$
 Total amount of interest earned = $R2\ 000 - R800 = R1\ 200$
 Number of years = [Total interest/Interest for 1 year] = $\frac{1\ 200}{140,80} = 8,52$ years ✓✓✓✓
6. Initial amount = R20 600
 Total interest for 8 years = R23 072
 Interest for 1 year: $\frac{23\ 072}{8} = R2\ 884$
 Rate = [Interest for 1 year/Initial amount] $\times 100 = \frac{2\ 884}{20\ 600} \times 100 = 14\%$ ✓✓✓✓✓
7. Initial amount = R3 290; final amount = R4 740,23
 Period = 32 months = $\frac{32}{12} = \frac{8}{3}$ years (= 2,67 years)
 Total interest for 32 months = $R4\ 740,23 - R3\ 290 = R1\ 450,23$
 Interest for 1 year: $(1\ 450,23 \div \frac{8}{3}) = R543,83$
 Rate = [Interest for 1 year/Initial amount] $\times 100 = \frac{543,83}{3\ 290} \times 100 = 16,53\%$ ✓✓✓✓✓

Worksheet 4 Compound interest: compounding annually

1. Interest earned in year 1: $9,7\%$ of R25 000 = $\frac{9,7}{100} \times 25\ 000 = R2\ 425$
 New amount = $R25\ 000 + R2\ 425 = R27\ 425$
 Interest earned in year 2: $9,7\%$ of R27 425 = $\frac{9,7}{100} \times 27\ 425 = R2\ 660,23$
 New amount = $R27\ 425 + R2\ 660,23 = R30\ 085,23$
 Interest earned in year 3: $9,7\%$ of R30 085,23 = $\frac{9,7}{100} \times 30\ 085,23 = R2\ 918,27$
 Final amount = $R30\ 085,23 + R2\ 918,27 = R33\ 003,50$ ✓✓✓✓✓✓✓✓
2. Interest earned in year 1: 8% of R9 375 = $\frac{8}{100} \times 9\ 375 = R750$
 New amount = $R9\ 375 + R750 = R10\ 125$
 Interest earned in year 2: 8% of R10 125 = $\frac{8}{100} \times 10\ 125 = R810$
 Compound interest earned = $R750 + R810 = R1\ 560$
 The correct answer is A. ✓✓

3. Interest charged in year 1: 11% of R8 000 = $\frac{11}{100} \times 8\,000 = \text{R}880$
 New amount = R8 000 + R880 = R8 880
 Interest charged in year 2: 11% of R8 880 = $\frac{11}{100} \times 8\,880 = \text{R}976,80$
 New amount = R8 880 + R976,80 = R9 856,80
 Interest charged in year 3: 11% of R9 856,80 = $\frac{11}{100} \times 9\,856,80 = \text{R}1\,084,25$
 Final amount = R9 856,80 + R1 084,25 = R10 941,05 ✓✓✓✓✓✓✓✓
4. Interest earned in year 1: 10% of R12 000 = $\frac{10}{100} \times 12\,000 = \text{R}1\,200$
 New amount = R12 000 + R1 200 = R13 200
 Interest earned in year 2: 10% of R13 200 = $\frac{10}{100} \times 13\,200 = \text{R}1\,320$
 New amount = R13 200 + R1 320 = R14 520
 Interest earned in year 3: 10% of R14 520 = $\frac{10}{100} \times 14\,520 = \text{R}1\,452$
 New amount = R14 520 + R1 452 = R15 972
 Interest earned in year 4: 10% of R15 972 = $\frac{10}{100} \times 15\,972 = \text{R}1\,597,20$
 Total interest = R1 200 + R1 320 + R1 452 + R1 597,20 = R5 569,20 ✓✓✓✓✓✓✓✓✓✓✓✓
5. Simple interest:
 Let the amount invested be Rx.
 Interest for 1 year: $\frac{8}{100} \times x = \text{R}0,08x$; Interest for 2 years: $\text{R}0,08 \times 2 = \text{R}0,16x$
 Total interest = R120
 $\therefore 0,16x = 120$ (Divide both sides of the equation by 0,16.)
 $\therefore x = \text{R}750$
 Compound interest:
 Interest earned in year 1: 8% of R750 = $\frac{8}{100} \times 750 = \text{R}60$
 New amount = R750 + R60 = R810
 Interest earned in year 2: 8% of R810 = $\frac{8}{100} \times 810 = \text{R}64,80$
 Compound interest earned = R60 + R64,80 = R124,80
 The correct answer is A. ✓✓✓
6. Interest earned in year 1: 8% of R10 500 = $\frac{8}{100} \times \text{R}10\,500 = \text{R}840$
 New amount = R10 500 + R840 = R11 340
 Interest earned in year 2: 8% of R11 340 = $\frac{8}{100} \times 11\,340 = \text{R}907,20$
 Final value of investment = R11 340 + R907,20 = R12 247,20 ✓✓✓✓✓✓✓✓

Worksheet 5 Compound interest: compounding semi-annually, quarterly and monthly

1. Initial amount R10 000; Interest rate = 12% p.a.; Period = 2 years
 Compounded half-yearly $\therefore 2n = 4$ interest periods; Interest $\frac{i}{2} = 6\%$ per half year
 1st half-year: 6% of R10 000 = $\frac{6}{100} \times 10\,000 = 600$
 New amount = R10 000 + R600 = R10 600
 2nd half-year: 6% of R10 600 = $\frac{6}{100} \times 10\,600 = 636$
 New amount = R10 600 + R636 = R11 236
 3rd half-year: 6% of R11 236 = $\frac{6}{100} \times 11\,236 = 674,16$
 New amount = R11 236 + R674,16 = R11 910,16
 4th half-year: 6% of R11 910,16 = $\frac{6}{100} \times 11\,910,16 = 714,61$
 Final amount = R11 910,16 + R714,61 = R12 624,77 ✓✓✓✓✓✓✓✓✓✓✓✓
2. Initial amount R4 000; Interest rate = 15% p.a.; Period = 1 year
 Compounded half-yearly $\therefore 2n = 2$ interest periods; Interest $\frac{i}{2} = \frac{15}{2} = 7,5\%$ per half year
 1st half year: $7,5\%$ of R4 000 = $\frac{7,5}{100} \times 4\,000 = \text{R}300$
 New amount = R4 000 + R300 = R4 300
 2nd half year: $7,5\%$ of R4 300 = $\frac{7,5}{100} \times 4\,300 = \text{R}322,50$
 Compound interest = R300 + R322,50 = R622,50 ✓✓✓✓✓✓✓✓

3. Initial amount R10 000; Interest rate = 17% p.a.; Period = 1 year
 Compounded quarterly $\therefore 4n = 4$ interest periods; Interest $\frac{i}{4} = \frac{17}{4} = 4,25\%$ per quarter
 1st quarter: $4,25\%$ of R10 000 = $\frac{4,25}{100} \times 10\ 000 = R425$
 New amount = R10 000 + R425 = R10 425
 2nd quarter: $4,25\%$ of R10 425 = $\frac{4,25}{100} \times 10\ 425 = R443,06$
 New amount = R10 425 + R443,06 = R10 868,06
 3rd quarter: $4,25\%$ of R10 868,06 = $\frac{4,25}{100} \times 10\ 868,06 = R461,89$
 New amount = R10 868,06 + R461,89 = R11 329,95
 4th quarter: $4,25\%$ of R11 329,95 = $\frac{4,25}{100} \times 11\ 329,95 = R481,52$
 Final amount = R11 329,95 + R481,52 = R11 811,47 ✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓
4. Initial amount R25 000; Interest rate = 12% p.a.; Period = 6 months = $\frac{1}{2}$ year
 Compounded quarterly $\therefore 4n = 4$ interest periods; Interest $\frac{i}{4} = \frac{12}{4} = 3\%$ per quarter
 1st quarter: 3% of R25 000 = $\frac{3}{100} \times 25\ 000 = R750$
 New amount = R25 000 + R750 = R25 750
 2nd quarter: 3% of R25 750 = $\frac{3}{100} \times 25\ 750 = R772,50$
 Total interest = R750 + R772,50 = R1 522,50 ✓✓✓✓✓✓✓✓✓✓
5. Initial amount R20 000; Interest rate = 9% p.a.; Period = 1 year
 Compounded monthly $\therefore 12n = 12$ interest periods; Interest $\frac{i}{12} = \frac{9}{12} = 0,75\%$ per month
 1st month: $0,75\%$ of R20 000 = $\frac{0,75}{100} \times 20\ 000 = R150$
 New amount = R20 000 + R150 = R20 150
 2nd month: $0,75\%$ of R20 150 = $\frac{0,75}{100} \times 20\ 150 = R151,13$
 New amount = R20 150 + R151,13 = R20 301,13
 3rd month: $0,75\%$ of R20 301,13 = $\frac{0,75}{100} \times 20\ 301,13 = R152,26$
 Interest earned after 3 months = R150 + R151,13 + R152,26 = R453,39 ✓✓✓✓✓✓✓✓✓✓✓✓✓✓
6. Initial amount R6 000; Interest rate = 16,2% p.a.; Period = 1 year
 Compounded monthly $\therefore 12n = 12$ interest periods; Interest $\frac{i}{12} = \frac{16,2}{12} = 1,35\%$ per month
 1st month: $1,35\%$ of R6 000 = $\frac{1,35}{100} \times 6\ 000 = R81$
 New amount = R6 000 + R81 = R6 081
 2nd month: $1,35\%$ of R6 081 = $\frac{1,35}{100} \times 6\ 081 = R82,09$
 New amount = R6 081 + R82,09 = R6 163,09
 3rd month: $1,35\%$ of R6 163,09 = $\frac{1,35}{100} \times 6\ 163,09 = R83,20$
 New amount = R6 163,09 + R83,20 = R6 246,29
 4th month: $1,35\%$ of R6 246,29 = $\frac{1,35}{100} \times 6\ 246,29 = R84,32$
 New amount = R6 246,29 + R84,32 = R6 330,61
 5th month: $1,35\%$ of R6 330,61 = $\frac{1,35}{100} \times 6\ 330,61 = R85,46$
 Final amount = R6 330,61 + R85,46 = R6 416,07 ✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓✓

Exam-type questions

1. Andile simple interest:
 Interest for 1 year: $\frac{5}{100} \times 5\ 000 = R250$
 Interest for 2 years: $R250 \times 2 = R500$
- Benito compound interest:
 Interest earned in year 1: 6% of R8 000 = $\frac{6}{100} \times 8\ 000 = R480$
 New amount = R8 000 + R480 = R8 480
 Interest earned in year 2: 6% of R8 480 = $\frac{6}{100} \times 8\ 480 = R508,80$
 New amount = R8 480 + R508,80 = R8 988,80

Total compound interest earned = R480 + R508,80 = R988,80
 Difference in interest = R988,80 - R500 = R488,80 ✓✓✓✓✓✓✓✓

2. Deposit for dishwasher = $\frac{10}{100} \times 4\,800 = R480$
 Balance to be paid over 3 years = R4 800 - R480 = R4 320
 Simple interest:
 Interest for 1 year: $\frac{18}{100} \times 4\,320 = R777,60$
 Interest for 3 years: $R777,60 \times 3 = R2\,332,80$
 Total cost of the dishwasher at the end of 3 years = R4 320 + R2 332,80 = R6 652,80
 Monthly instalment = $\frac{6\,652,80}{36} = R184,80$ (Remember 3 years = 36 months) ✓✓✓✓✓✓

3. Initial value: R12 000; interest rate: 15,8%; period: 3 years
 Simple interest:
 Interest for 1 year: $\frac{15,8}{100} \times 12\,000 = R1\,896$
 Interest for 3 years: $R1\,896 \times 3 = R5\,688$
 Compound interest:
 Interest earned in year 1: 15,8% of R12 000 = $\frac{15,8}{100} \times 12\,000 = R1\,896$
 New amount = R12 000 + R1 896 = R13 896
 Interest earned in year 2: 15,8% of R13 896 = $\frac{15,8}{100} \times 13\,896 = R2\,195,57$
 New amount = R13 896 + R2 195,57 = R16 091,57
 Interest earned in year 3: 15,8% of R16 091,57 = $\frac{15,8}{100} \times 16\,091,57 = R2\,542,47$
 Total interest = R1 896 + R2 195,57 + R2 542,47 = R6 634,04
 Difference in interest = R6 634,04 - R5 688 = R946,04 ✓✓✓✓✓✓✓✓

4. Simple interest: Let the amount invested be R x
 Interest for 1 year: $\frac{8}{100} \times x = R0,08x$
 Interest for 2 years: $R0,08x \times 2 = R0,16x$
 Total interest = R120
 $\therefore 0,16x = 120$ (Divide both sides of the equation by 0,16.)
 $\therefore x = R750$
 Amount of money invested is R750.
 Compound interest:
 Interest earned in year 1: 8% of R750 = $\frac{8}{100} \times 750 = R60$
 New amount = R750 + R60 = R810
 Interest earned in year 2: 8% of R810 = $\frac{8}{100} \times 810 = R64,80$
 Total compound interest for 2 years = R60 + R64,80 = R124,80 ✓✓✓✓✓✓✓✓

- 5.1 Interest for 1 year: $\frac{9,25}{100} \times 12\,400 = R1\,147$
 Interest for 3 years: $R1\,147 \times 3 = R3\,441$ ✓✓
 5.2 Total amount to be repaid = R12 400 + R3 441 = R15 841 ✓✓
 5.3 Monthly instalment = $\frac{15\,841}{36} = R440,03$ (Remember 3 years = 36 months) ✓✓

- 6.1 Yearly:
 1 year at 10% p.a. $10\% \text{ of } R2\,700 = \frac{10}{100} \times 2\,700 = R270$
 Final amount = R2 700 + R270 = R2 970 ✓✓✓

- 6.2 Quarterly:
 1 year = 4 quarters $10\% \text{ p.a.} = \frac{10}{4} = 2,5\% \text{ per quarter}$
 1st quarter: $2,5\% \text{ of } R2\,700 = \frac{2,5}{100} \times 2\,700 = R67,50$
 New amount = R2 700 + R67,50 = R2 767,50
 2nd quarter: $2,5\% \text{ of } R2\,767,50 = \frac{2,5}{100} \times 2\,767,50 = R69,19$
 New amount = R2 767,50 + R69,19 = R2 836,69
 3rd quarter: $2,5\% \text{ of } R2\,836,69 = \frac{2,5}{100} \times 2\,836,69 = R70,92$
 New amount = R2 836,69 + R70,92 = R2 907,61
 4th quarter: $2,5\% \text{ of } R2\,907,61 = \frac{2,5}{100} \times 2\,907,61 = R72,69$

$$\text{Final amount} = \text{R}2\,907,61 + \text{R}72,69 = \text{R}2\,980,30 \checkmark\checkmark\checkmark\checkmark\checkmark\checkmark\checkmark\checkmark$$

6.3 Half-yearly:

$$1 \text{ year} = 2 \text{ half-years} \quad 10\% \text{ p.a.} = \frac{10}{2} = 5\% \text{ per half year}$$

$$\text{1st half year: } 5\% \text{ of R}2\,700 = \frac{5}{100} \times 2\,700 = \text{R}135$$

$$\text{New amount} = \text{R}2\,700 + \text{R}135 = \text{R}2\,835$$

$$\text{2nd half year: } 5\% \text{ of R}2\,835 = \frac{5}{100} \times 2\,835 = \text{R}141,75$$

$$\text{Final amount} = \text{R}2\,835 + \text{R}141,75 = \text{R}2\,976,75 \checkmark\checkmark\checkmark\checkmark$$

7.1 Interest earned in year 1: $10,5\% \text{ of R}1\,000 = \frac{10,5}{100} \times 1\,000 = \text{R}105$

$$\text{New amount at the end of year 1} = \text{R}1\,000 + \text{R}105 = \text{R}1\,105$$

$$\text{Interest earned in year 2: } 10,5\% \text{ of R}1\,105 = \frac{10,5}{100} \times 1\,105 = \text{R}116,03$$

$$\text{New amount at the end of year 2} = \text{R}1\,105 + \text{R}116,03 = \text{R}1\,221,03$$

$$\text{Interest earned in year 3: } 10,5\% \text{ of R}1\,221,03 = \frac{10,5}{100} \times 1\,221,03 = \text{R}128,21$$

$$\text{New amount at the end of year 3} = \text{R}1\,221,03 + \text{R}128,21 = \text{R}1\,349,24 \checkmark\checkmark\checkmark\checkmark\checkmark\checkmark$$

7.2 Interest earned in year 4: $10,5\% \text{ of R}1\,349,24 = \frac{10,5}{100} \times 1\,349,24 = \text{R}141,67$

$$\text{New amount at the end of year 4} = \text{R}1\,349,24 + \text{R}141,67 = \text{R}1\,490,91 \checkmark\checkmark$$

8. Interest for 1 year: $\frac{11,24}{100} \times 40\,000 = \text{R}4\,496$

$$\text{Total amount of interest earned} = \text{R}53\,488 - \text{R}40\,000 = \text{R}13\,488$$

$$\text{Number of years} = [\text{Total interest} / \text{Interest for 1 year}] = \frac{13\,488}{4\,496} = 3 \text{ years } \checkmark\checkmark\checkmark\checkmark\checkmark\checkmark$$

9. Total interest for 6 years = $\text{R}31\,470 - \text{R}15\,000 = \text{R}16\,470$

$$\text{Interest for 1 year: } \frac{16\,470}{6} = \text{R}2\,745$$

$$\text{Rate} = [\text{Interest for 1 year} / \text{Initial amount}] \times 100 = \frac{2\,745}{15\,000} \times 100 = 18,3\% \checkmark\checkmark\checkmark\checkmark\checkmark\checkmark$$

Solutions: Topic 3 – Scale, plans and maps

Worksheet 1 Scale

- 1.1 20 m ✓
- 1.2 0,2 km ✓
- 1.3 32 cm ✓
- 1.4 0,8 km ✓
- 1.5 800 cm ✓
- 1.6 1 : 684 ✓

- 2.1 f ✓
- 2.2 c ✓
- 2.3 e ✓
- 2.4 b ✓
- 2.5 h ✓
- 2.6 d ✓
- 2.7 g ✓
- 2.8 a ✓

Worksheet 2 Provincial map

- 1. Eastern Cape, Northern Cape, Kwazulu-Natal, Mpumalanga, North West, Gauteng ✓✓✓✓✓✓
- 2. Lesotho ✓✓
- 3. Bloemfontein ✓✓
- 4. N1, N3, N5, N6, N8 ✓✓✓✓✓
- 5. One ✓✓
- 6. Built up areas ✓✓
- 7. Kalkfontein Dam ✓✓
- 8. Sandveld ✓✓
- 9. E2 ✓✓
- 10. C5 and C6 ✓✓✓
- 11. West ✓✓
- 12. South West ✓✓
- 13. Head out in a NE direction along the N1, turn right onto the N5 at Winburg, turn left onto the N3 at Harrismith, continue along the N3 until you reach Warden. ✓✓✓✓
- 14. Senekal ✓✓
- 15. 1,5 cm is equivalent to 50 km
 $50 \text{ km} = 50 \times 100\,000 = 5\,000\,000 \text{ cm}$
Ratio is 1,5 : 5 000 000
More correctly: 1 : 3 300 000 (rounded to nearest 100 000) ✓✓✓
- 16. 9,2 cm (9,0–9,4 cm acceptable) ✓✓✓
- 17. $9,2 \text{ cm} \div 1,5 \text{ cm} = 6,1333\dots$
 $50 \times 6,1333 = 306,665$
307 km is the distance ✓✓✓✓✓✓



18. Distance on the map approximately 10 cm (9,9–10,1 cm acceptable) Scale: 1,5 cm = 50 km
 $10 \div 1,5 = 6,666$
 $50 \times 6,666 = 333 \text{ km}$ ✓✓✓✓✓✓
19. Those distances measure in straight lines, but the roads between the two towns are not flat and straight. ✓✓
20. The distance between the two will be more (longer), because the roads are not straight. ✓✓

Worksheet 3 House plan

1. Bedroom 2 and Lounge ✓✓
2. 3 ✓✓
3. It is an open plan kitchen. Kitchens do not require the same privacy as bedrooms or bathrooms and so can be open-plan ✓✓
4. Bedroom 1 and Kitchen as they face south, so will not get any direct sun. (However, the bathroom has a very small window and does not face the sun.) ✓✓✓
5. 9 windows ✓✓
6. $2,5 \text{ m} \times 3 \text{ m}$ ✓✓✓
7. $2,5 \times 3 = 7,5 \text{ m}^2$ ✓✓
8. $\frac{7,5}{0,5} = 15 \text{ m}^2$ needed
 $15 \times \text{R}85 = \text{R}1\,275$ ✓✓✓
9. $7 \times 8,5 = 59,5 \text{ m}^2$
 $3 \times 2 = 6 \text{ m}^2$
 $59,5 - 6 = 53,5 \text{ m}^2$ is the actual area. Therefore, the quote is wrong. ✓✓✓✓
10. 4 cm represents 3 m; $3 \text{ m} = 3 \times 100 = 300 \text{ cm}$
 $4 : 300$
 $1 : 75$ is the ratio scale. ✓✓✓
11. The measured distance on plan between the windows is 1,8 cm.
 Convert the size on the plan to the real-life size using the ratio: $1,8 \times 75 = 135 \text{ cm}$.
 (Measurements may vary slightly, but should still show that there is more than 80 cm available in real-life.)
 Yes, there will be enough space between the windows. ✓✓✓✓

Worksheet 4 Shopping mall floor plan

1. 5 entrances. 5, 6, 7, 8 and 15 ✓✓
2. Toilets ✓
3. Mr Price Sport ✓
4. Northeast ✓✓
5. Mr Price and Incredible Connection ✓✓
6. Yes, there are many baby changing facilities all around. ✓✓✓
7. 6; a restroom will include toilets, baby-changing facility and parent-child toilets at one location. ✓✓

8. Turn right, walk with the shops on your left. After you have passed four shops, turn left up the passageway, the toilets are found in this passage on your right. ✓✓✓
9. As you enter Entrance 6, walk straight ahead, turn right just beyond the escalators. When you see the information desk, turn left. Continue past the centre court and you will find the food court. ✓✓✓
10. It has two entrances so shoppers can enter through both sides and use it as a passageway. It is close to the other clothing stores. It is quite centrally located. ✓✓
11.  is the customer service desk where there are staff to assist and answer questions.
 are the mall information screens. Here you will find an interactive map to see where shops are located, a self-help information service. ✓✓
12. No, it is very far from the food court so would not be an ideal location. Secondly, it is a very big shop – no restaurant would need that amount of space and rent would be very high for such a large area. ✓✓✓✓✓
13. 1 : 2 000; 1 cm represents 2 000 cm
Harry walked $152 \times 2\,000 = 304\,000$ cm
 $304\,000 \text{ cm} \div 100 = 3\,040 \text{ m} = (3\,040 \div 1\,000) \text{ km} = 3,040 \text{ km}$
Harry walked 3 040 m or 3,04 km in total. ✓✓✓
14. 1. Stuttafords 2. Standard Bank 3. Game 4. Mr Price Home ✓✓✓✓✓

Worksheet 5 Stadium layout

1. Section 6 ✓✓
2. Section 15, 16, 34, or 35 ✓✓✓✓
3. Harry's seat will cost more. It is in the middle of the field and will have the best view of the field and most of the action. Mbali's seat will have limited views and only have a good view when one side is about to score. ✓✓✓
4. The stadium is very and seats many thousands of people, so they cannot all enter through one entrance. There will also be a far distance to walk within the stadium if spectators cannot enter near to their seats. Fewer entrances will cause congestion within the stadium. ✓✓✓
5. 14 ✓✓
6. Northwest (NW) ✓✓
7. By measurement we see that 1 cm represents 22 m.
 $22 \text{ m} = 2\,200 \text{ cm}$
1 : 2 200 ✓✓✓✓

Worksheet 6 National park map

1. 3 entrances ✓✓
2. South ✓✓
3. Reference Point 25 ✓✓
4. $4,7 + 6,2 = 10,9 \text{ km}$ ✓✓✓
5. Some points may be too close together to be shown clearly on the map. (Any other reasonable explanation acceptable.) ✓✓
6. Addo Main Camp ✓✓

7. 40 km/hour ✓✓
8. No, the gate off the N10 is a "No entry"-gate. ✓✓✓
9. From point 1, turn right.
At point 5, turn right again.
At point 11, turn right.
Continue to point 22, then turn right.
At point 23, turn right.
The campsite will be at point 25 on your right. ✓✓✓✓✓
10. 4 km ✓✓
11. Algoa Bay Lookout Point ✓✓
12. R335 ✓✓
13. Kadouw Lookout Point ✓✓
14. 05h30 to 18h30 ✓✓
15. The summer opening hours are longer than winter's opening hours because the sun rises earlier and sets later in summer. ✓✓

Exam-type questions

- 1.1 Living Room and Dining Room ✓✓
- 1.2 3 ✓✓
- 1.3 2 ✓✓
- 1.4 330 cm × 310 cm
3,3 m × 3,1 m ✓✓✓
- 1.5 $9,60 \times 7,80 = 74,88$
 $6,50 \times 1,10 = 7,15$
 $74,88 - 7,15 = 67,73 \text{ m}^2$ ✓✓✓✓✓✓
- 1.6 Well-designed (positives): The living areas will get a lot of sunlight; the bathroom is well situated and easily accessible to both bedrooms as well as guests.
Poorly designed (negatives): Both bedrooms are south-facing and so will never get direct sunlight and be cold. ✓✓✓✓✓✓
- 2.1 3 ✓✓
- 2.2 Polokwane ✓✓
- 2.3 C6 ✓✓
- 2.4 Botswana, Zimbabwe and Mozambique ✓✓✓
- 2.5 Population between 100 000 and 1 000 000 in an urban settlement. ✓✓
- 2.6 20 000 to 100 000 ✓✓
- 2.7 N1 and N11 ✓✓
- 2.8 Southeast ✓✓
- 2.9 1 : 3 000 000
 $3\ 000\ 000 \div 100 = 30\ 000 \text{ m}$
 $30\ 000 \div 1\ 000 = 30 \text{ km}$
So, 1 cm on the map represents 30 km in real life. ✓✓✓
- 2.10 Distance on the map = 13 cm (12,8 to 13,2 cm acceptable)
1 cm represents 30 km
 $13 \times 30 = 390 \text{ km}$ ✓✓✓✓
- 2.11 No, the distance will be much further as the roads between the two towns are not straight. ✓✓✓
- 3.1 Entrance 5 ✓✓
- 3.2 Section 2 ✓✓
- 3.3 Section 3, they are furthest from the stage and toward the sides of the hall so they will not have the clearest view. ✓✓✓
- 3.4 $16 + 20 + 24 + 28 + 32 + 36 + 40 + 39 = 235 \text{ seats}$ ✓✓✓✓
- 3.5 Row H Seats 29–33 ✓✓

- 4.1 5 schools ✓✓
- 4.2 Distance on map: 3,2 cm (3-3,5 acceptable)
Scale 1 cm = 100 m
 $3,2 \times 100 = 320$ m apart ✓✓✓✓
- 4.3 Delville Road and R61 (Sutherland Street) ✓✓
- 4.4 Southeast ✓✓
- 4.5 Travel in a southerly direction.
Turn left onto Heathcote Street.
Continue until the T-junction, then turn right onto York Street.
Turn right off York Street onto Victoria Street (Nelson Mandela Drive is also acceptable).
The school will be on your left. ✓✓✓✓

Solutions: Topic 4 – Shapes

Worksheet 1 Triangle measurements: perimeter, area and volume

- 1.1 $c^2 = 362 + 482 = 1\,296 + 2\,304 = 3\,600$
 $c = \sqrt{3\,600} = 60$
 $36 + 48 + 60 = 144 \text{ mm } \checkmark\checkmark\checkmark\checkmark$
- 1.2 $\frac{15}{2} = 7,5$
 $c^2 = 52 + 7,52 = 25 + 56,25 = 81,25$
 $c = \sqrt{81,25} = 9,01$
 $9,01 + 9,01 + 15 = 33,02 \text{ mm } \checkmark\checkmark\checkmark\checkmark$
- 2.1 One triangle $\frac{1}{2} \times 27 \times 14 = 189$
Both triangles $= 189 \times 2 = 378 \text{ cm}^2 \checkmark\checkmark\checkmark$
- 2.2 $a^2 = 632 - 482 = 3\,969 - 2\,304 = 1\,665$
 $a = \sqrt{1\,665} = 40,80$
 $\frac{1}{2} \times (72 + 40,8) \times 48 = 2\,707,2 \text{ mm}^2 \checkmark\checkmark\checkmark\checkmark$
- 3.1 $15 \text{ cm} = \frac{15}{100} \text{ m} = 0,15 \text{ m}$
 $3 - 0,15 - 0,15 = 2,7$
 $4 - 0,15 - 0,15 = 3,7$
 $5 - 0,15 - 0,15 = 4,7$
 $2,7 + 3,7 + 4,7 = 11,1 \text{ m } \checkmark\checkmark\checkmark\checkmark$
- 3.2 $\frac{1}{2} \times 3 \times 4 = 6 \text{ m}^2$
 $\frac{1}{2} \times 2,7 \times 3,7 = 4,995 \text{ m}^2$
 $6 - 4,995 = 1,005 \text{ m}^2 \checkmark\checkmark\checkmark\checkmark\checkmark\checkmark$
- 3.3 $7 \text{ cm} = \frac{7}{100} \text{ m} = 0,07 \text{ m}$
 $4,995 \times 0,07 = 0,35 \text{ m}^3 \checkmark\checkmark\checkmark\checkmark$
- 3.4 $0,35 \div 0,1 = 3,5 \text{ bags} = 4 \text{ bags } \checkmark\checkmark$
- 3.5 $R147,85 \times 4 \text{ bags} = R591,40 \checkmark\checkmark$
- 3.6 $5 + 3 + 4 = 12$
 $\frac{12}{2} = 6 \text{ lights } \checkmark\checkmark$

Worksheet 2 Triangles: problem solving

- 1.1 $c^2 = 22 + 2,52 = 4 + 6,25 = 10,25$
 $c = \sqrt{10,25} = 3,20$
 $3,20 \times 2 = 6,4 \text{ m } \checkmark\checkmark\checkmark\checkmark$
- 1.2 $3,20 \times 250\% = 8 \text{ m } \checkmark\checkmark\checkmark\checkmark$
- 1.3 $(\frac{1}{2} \times 4 \times 2,5) \times 2 = 5 \text{ m}^2 \times 2 = 10 \text{ m}^2 \checkmark\checkmark\checkmark\checkmark$
- 2.1 $100\% - 25\% = 75\%$
 $4\,000 \times 75\% = 3\,000 \text{ mm } \checkmark\checkmark\checkmark\checkmark$
- 2.2 $c^2 = 2\,000^2 + 3\,000^2 = 4\,000\,000 + 9\,000\,000 = 13\,000\,000$
 $c = \sqrt{13\,000\,000} = 3\,605,55$
 $3\,605,55 \times 2 = 7\,211,1 \text{ mm } \checkmark\checkmark\checkmark\checkmark$
- 2.3 $\frac{1}{2} \times 4\,000 \times 3\,000 = 6\,000\,000 \text{ mm}^2 \checkmark\checkmark\checkmark$
- 2.4.1 $5 \text{ cm} \times 10 = 50 \text{ mm}; 2,5 \text{ cm} \times 10 = 25 \text{ mm}$
 $\frac{1}{2} \times 50 \times 25 = 625 \text{ mm}^2 \checkmark\checkmark\checkmark\checkmark$
- 2.4.2 $6\,000\,000 \div 625 = 9\,600 \text{ triangles } \checkmark\checkmark\checkmark$
- 2.4.3 $9\,600 \times R5,59 = R53\,664$ for one side of the roof
 $R53\,664 \times 2 = R107\,328$ to decorate both front and back. $\checkmark\checkmark\checkmark\checkmark\checkmark$

Worksheet 3 Rectangle measurements: perimeter, area, volume and surface area

- 1.1 $(81 \times 2) + (12 \times 2) = 162 + 24 = 186 \text{ m}$ ✓✓✓
1.2 Width: $\frac{800}{4} = 200 \text{ mm}$
Length: $\frac{1500}{15} = 100 \text{ mm}$ ✓✓✓
2.1 $1,3 \times 0,45 = 0,585 \text{ m}^2$ ✓✓✓
2.2 $125 \times 85 = 10\,625 \text{ cm}^2$
 $100 \times 65 = 6\,500 \text{ cm}^2$
 $10\,625 - 6\,500 = 4\,125 \text{ cm}^2$ ✓✓✓✓
3.1 $16 \times 3 \times 7 = 336 \text{ mm}^3$ ✓✓✓✓
3.2 $20 \times 15 \times 3 = 900 \text{ cm}^3$ ✓✓✓✓
4.1 $2(10 \times 5) + 2(10 \times 25) + 2(5 \times 25) = 100 + 500 + 250 = 850 \text{ cm}^2$ ✓✓✓✓
4.2 $(0,5 \times 0,15) + 2(0,5 \times 0,3) + 2(0,3 \times 0,15)$
 $= 0,075 + 0,3 + 0,09$
 $= 0,465 = 0,47 \text{ m}^2$ ✓✓✓✓✓

Worksheet 4 Rectangles: problem solving

- 1.1 Width: $4 + 1 + 1 = 6 \text{ m}$; Length: $5 \times 2 = 10 \text{ m}$; $10 + 1 + 1 = 12 \text{ m}$
 $(2 \times 6) + (2 \times 12) = 12 + 24 = 36 \text{ m}$ ✓✓✓✓
1.2 Length: $5 + 1 + 1 = 7$; Width: $4 + 1 + 1 = 6$;
 $7 \times 6 = 42 \text{ m}^2$ ✓✓✓✓
1.3 Big pool: $(4 \times 10) + 2[(4 \times 1,5) + (10 \times 1,5)] = 40 + 2(6 + 15) = 40 + 42 = 82 \text{ m}^2$
Little pool: $(4 \times 5) + 2[(4 \times 0,5) + (5 \times 0,5)] = 20 + 2(2 + 2,5) = 20 + 9 = 29 \text{ m}^2$ ✓✓✓✓✓
1.4 $82 + 29 = 111 \text{ m}^2$ to paint
One litre covers 2 m^2 , $\frac{111}{2} = 55,5 \text{ L}$
But, 2 coats of paint needed so $55,5 \times 2 = 111 \text{ L}$ paint needed
Cost: $111 \times 275 = \text{R}30\,525$ ✓✓✓✓
1.5 $5 \times 4 \times 0,5 = 10 \text{ m}^3 \times 89\% = 8,9 \text{ m}^3$ water needed ✓✓✓✓
1.6 $10 \times 4 \times 1,5 = 60 \text{ m}^3 \times 89\% = 53,4 \text{ m}^3$; $53,4 - 8,9 = 44,5 \text{ m}^3$ more water needed ✓✓✓✓✓
2.1 $96 - 3 - 3 = 90$; $49 - 3 - 3 = 43$;
 $(90 \times 2) + (43 \times 2) = 226 \text{ m}$ ✓✓✓✓
2.2 $90 \times 43 = 3\,870 \text{ m}^2$ ✓✓✓✓
2.3 $3\,870 \times 15\% = 580,5 \text{ m}^2$;
 $3\,870 + 580,5 = 4\,450,5 \text{ m}^2$
 $4\,450,5 \times 79,95 = \text{R}355\,817,48$ ✓✓✓✓✓
2.4.1 $2 \times 10 = 20 \text{ m}^2$ ✓✓
2.4.2 $(4 \times 90 \times 2) + (4 \times 43 \times 2) - 20 = 720 + 344 - 20 = 1\,044 \text{ m}^2$ ✓✓✓✓✓
2.4.3 One litre covers 5 m^2 , $1\,044 \div 5 = 208,8 \text{ L}$
But 2 coats are needed $208,8 \text{ L} \times 2 = 417,6 = 418 \text{ L}$
Paint sold in 20 L containers: $417,6 \div 20 = 20,88 = 21$ containers ✓✓✓✓✓
2.5 $90 \times 43 \times 4 = 15\,480 \text{ m}^3$
 $(15\,480 \div 0,25) = 61\,920$ units of animal feed ✓✓✓✓✓

Worksheet 5 Square measurements: perimeter, area and volume

- 1.1 $18 \times 4 = 72 \text{ m}$ ✓✓✓
1.2 $25 - 2,5 - 2,5 = 20$; $20 \times 4 = 80 \text{ cm}$ ✓✓✓✓
2.1 $3\,000 \times 3\,000 = 9\,000\,000 \text{ mm}^2$ ✓✓✓
2.2 $10 \times 10 = 100 \text{ cm}^2$ ✓✓✓
3.1 $20 \times 4 = 80 \text{ mm}$ ✓✓
3.2 $20 \times 3 = 60 \text{ mm}$ ✓✓✓
3.3 $60 \times 4 = 240 \text{ mm}$ ✓✓✓
3.4 $27 \times 20 = 540 \text{ mm}$ ✓✓✓

- 3.5 $20 \times 20 = 400 \text{ mm}^2$ ✓✓✓
 3.6 $400 \times 6 = 2\,400 \text{ mm}^2$ ✓✓✓
 3.7 You could multiply the surface area of one small cube by the number of small cube faces on a big side:
 $400 \times 9 = 3\,600 \text{ mm}^2$ ✓✓✓
 (Or, the length of a side of the big cube, squared: $60 \times 60 = 3\,600 \text{ mm}^2$)
 3.8 $3\,600 \times 6 = 21\,600 \text{ mm}^2$ ✓✓✓
 3.9.1 $20 \times 20 \times 20 = 8\,000 \text{ mm}^3$ ✓✓✓
 3.9.2 $60 \times 60 \times 60 = 216\,000 \text{ mm}^3$ ✓✓✓
 3.9.3 $216\,000 \times 2\,500 = 540\,000\,000 \text{ mm}^3$ ✓✓✓

Worksheet 6 Squares: problem solving

- 1.1 54 crates stacked in 3 layers: $54 \div 3 = 18$ crates per layer
 Each layer could hold 3×6 or 2×9 or 1×18 crates.
 1×18 is unrealistic.
 3×6 means the trailer will be 3,6 m wide which is dangerous (illegal on public road).
 \therefore Assume the trailer is packed with 2 crates \times 9 crates.
 $2 \times 1,2 = 2,4 \text{ m}$; $9 \times 1,2 = 10,8 \text{ m}$; $3 \times 1,2 = 3,6 \text{ m}$
 So, the trailer is 2,4 m wide \times 10,8 m long \times 3,6 m high ✓✓✓✓✓
- 1.2 Crates stacked 3 high: height = $3 \times 1,2 = 3,6 \text{ m}$
 Load is 1,6 m above ground: $3,6 + 1,6 = 5,2 \text{ m}$ ✓✓✓✓
- 1.3 $[3,6 \div (1,2 \times 3)] = 1$ length per side per crate
 Four sides: $1 \times 4 = 4$ lengths per crate
 $54 \times 4 = 216$ lengths ✓✓✓✓✓
- 1.4.1 $1,2 \times 1,2 = 1,44 \text{ m}^2$ ✓✓✓
 1.4.2 $1,44 \times 153,99 = \text{R}221,75$ ✓✓
 1.4.3 $\text{R}221,75 \times 54 = \text{R}11\,974,50$ ✓
 1.5 $1,2 \times 1,2 \times 1,2 = 1,728 \text{ m}^3$ ✓✓✓
- 2.1 One side: $(10 \times 6) + (5 \times 2) = 60 + 10 = 70 \text{ cm}$
 Dimensions $70 \text{ cm} \times 70 \text{ cm}$ ✓✓✓
- 2.2 $70 \times 70 = 4\,900 \text{ cm}^2$ ✓✓✓
- 2.3 $140 \text{ mm} \div 10 = 14 \text{ cm}$; $70 \div 14 = 5$ boxes on one side
 $5 \times 5 = 25$ boxes ✓✓✓
 (Or, $14 \text{ cm} \times 14 \text{ cm} = 196 \text{ cm}^2$; $4\,900 \div 196 = 25$ boxes)
- 2.4.1 $14 \times 14 \times 14 = 2\,744 \text{ cm}^3$ ✓✓✓
 2.4.2 $2\,744 \times 25 \times 20 = 1\,372\,000 \text{ cm}^3$ ✓✓✓
 2.5.1 $14 \times 20 = 280 \text{ cm}$ ✓✓
 2.5.2 $280 + 280 + 70 = 630 \text{ cm}$ ✓✓
 2.6.1 $4\,900 \times 25 = 122\,500 \text{ cm}^2$ ✓✓
 2.6.2 25 boxes \times 20 layers = 500 boxes per pallet
 500×25 pallets = 12 500 boxes ✓✓✓✓

Worksheet 7 Circle measurements: circumference, area, volume and surface area

- 1.1 Radius = $\frac{15}{2} = 7,5 \text{ cm}$
 Circumference = $2 \times 3,142 \times 7,5 = 47,13 \text{ cm}$ (Or $3,142 \times 15 = 47,13 \text{ cm}$) ✓✓✓✓
- 1.2 B: $2 \times 3,142 \times 6 = 37,704 \text{ m}$
 C: Radius = $\frac{6}{2} = 3 \text{ m}$; $2 \times 3,142 \times 3 = 18,852 \text{ m}$ ✓✓✓✓
- 2.1 $3,142 \times 122 = 452,448 \text{ mm}^2$ ✓✓✓✓✓
- 2.2 Radius (big circle) = $\frac{120}{2} = 60 \text{ m}$; $3,142 \times 602 = 11\,311,2 \text{ m}^2$
 Radius (small circle) = 20 m ; $3,142 \times 202 = 1\,256,8 \text{ m}^2$
 Area of outer ring: $11\,311,2 - 1\,256,8 = 10\,054,4 \text{ m}^2$ ✓✓✓✓✓✓
- 3.1 Radius = $\frac{12}{2} = 6 \text{ cm}$
 Volume: $3,142 \times 62 \times 45 = 5\,090,04 \text{ cm}^3$ ✓✓✓✓✓✓

- 3.2 B: Radius = $\frac{10}{2} = 5$ mm
 Volume (B) = $3,142 \times 52 \times 2 = 157,1$ mm³
 C: Radius = $\frac{20}{2} = 10$ mm
 Volume (C) = $3,142 \times 102 \times 10 = 3\,142$ mm³
 $\therefore (3\,142 \div 157,1) = 20$ cans ✓✓✓✓✓✓
- 4.1 Radius = $\frac{2}{2} = 1$ m
 Surface area = area of 2 ends (circles) + area of tube (rectangle with circumference of circle as length and height of cylinder as width)
 $2(3,142 \times 12) + (2 \times 3,142 \times 1 \times 5) = 6,284 + 31,42 = 37,704$ m² ✓✓✓✓
- 4.2 Radius = $\frac{20}{2} = 10$ cm
 A pot is regarded as an open cylinder:
 Surface area = area of 1 end (circle) + area of tube (rectangle with circumference of pot as length and height of pot as width)
 $(3,142 \times 102) + (2 \times 3,142 \times 10 \times 15) = 314,2 + 942,60 = 1\,256,80$ cm² ✓✓✓✓✓✓

Worksheet 8 Circles: problem solving

- 1.1 Radius = $\frac{150}{2} = 75$ cm
 $2 \times 3,142 \times 75 = 471,3$ cm ✓✓✓✓
 (Or $3,142 \times 150 = 471,3$ cm)
- 1.2 Radius including paving = $100 + 75 = 175$ cm
 Circumference around path: $2 \times 3,142 \times 175 = 1\,099,7$ cm
 Number of bricks: $(1\,099,7 \div 10) = 109,97 = 110$ bricks ✓✓✓✓✓
- 1.3 $(3,142 \times 752) + (2 \times 3,142 \times 75 \times 75) = 17\,673,75 + 35\,347,5 = 53\,021,25$ cm² ✓✓✓✓✓
- 1.4 $(53\,021,25 \div 10\,000) = 5,302125 \times 100$ mL = 530,213 mL ✓✓
- 1.5 Volume of pond: $3,142 \times 752 \times 75 = 1\,325\,531,25$ cm³
 Pond refilled twice per week: $1\,325\,531,25 \text{ cm}^3 \times 2 = 2\,651\,062,50$ cm³ ✓✓✓✓✓✓
- 2.1 $5,8 \text{ cm} \times 10 = 58$ mm
 Radius = $\frac{58}{2} = 29$ mm
 Surface area of top and bottom = $2(3,142 \times 29^2) = 5\,284,844$ mm²
 Surface area of side = $2 \times 3,142 \times 29 \times 115 = 20\,957,14$
 Surface area of can $5\,284,844 + 20\,957,14 = 26\,241,984$ mm² ✓✓✓✓✓✓
- 2.2 Volume of can = $3,142 \times 29^2 \times 115 = 303\,878,53$ mm³
 $95\% \times 303\,878,53 \text{ mm}^3 = 288\,684,60$ mm³
 $288\,684,60 \div 1\,000 = 288,69$ mL ✓✓✓✓
- 2.3 $2 \times 3,142 \times 29 = 182,236$ mm ✓✓✓
- 2.4 $182,236 \times 5 = 911,18$ mm² ✓✓✓
- 2.5 From 2.1: surface area = 26 241,984 mm²
 Cost is $0,0015\text{c/mm}^2 = 26\,241,984 \text{ mm}^2 \times 0,0015 = 39\text{c} = \text{R}0,39$ ✓✓✓✓✓✓✓
- 2.6.1 Length: $3 \times 58 \text{ mm} = 174$ mm; Width: $2 \times 58 = 116$ mm ✓✓
- 2.6.2 $288,69 \times 6 = 1\,732,14$ mL ✓✓✓

Worksheet 9 Shapes and objects: problem solving

- 1.1 Bottom of pool: $c^2 = 25^2 + 3^2 = 625 + 9 = 634$
 $c = \sqrt{634} = 25,18$ m
 Area of bottom: $25,18 \times 15 = 377,7$ m²
 Area of 2 sides: $2 \times (\frac{1}{2} \times 3 \times 25) = 2 \times 37,5 \text{ m}^2 = 75 \text{ m}^2$
 Area of side at deep end: $3 \times 15 = 45 \text{ m}^2$
 Total surface area: $377,7 + 75 + 45 = 497,7$ m² ✓✓✓✓✓✓✓
- 1.2 $497,7 \div 5 = 99,54$ L ✓✓✓
- 1.3 $99,54 \times 45,95 = \text{R}4\,573,86$ ✓✓
- 1.4 Volume of pool: $\frac{1}{2} \times 3 \times 25 \times 15 = 562,50$ m³
 $562,50 \text{ m}^3 \times 85\% = 478,13$ m³ ✓✓✓✓✓✓

- 2.1 $15 \text{ cm} \div 100 = 0,15 \text{ m}; 4 \times 0,15 = 0,6 \text{ m} \checkmark\checkmark\checkmark$
- 2.2 Radius = $\frac{18}{2} = 9$
Volume: $3,142 \times 9^2 \times 0,6 = 152,70 \text{ m}^3 \checkmark\checkmark\checkmark$
- 2.3 Circumference: $2 \times 3,142 \times 9 = 56,56 \text{ m} \checkmark\checkmark\checkmark$
- 3.1 $125 \times 65 = 8\,125 \text{ m}^2 \checkmark\checkmark\checkmark$
- 3.2 $8\,125 \div 1,5 = 5\,416,67 \text{ m}^2 \checkmark\checkmark$
- 3.3 $(125 \times 2) + (65 \times 2) = 250 + 130 = 380; 380 - 2,6 = 377,4 \text{ m};$
Cost of fencing: $377,4 \text{ m} \times \text{R}94,50 = \text{R}35\,664,30$
Total cost: $\text{R}35\,664,30 + 450 = \text{R}36\,114,30 \checkmark\checkmark\checkmark\checkmark$
- 4.1 $45 - 25 = 20 \text{ m}; 95 - 75 = 20 \text{ m};$
 $95 \times 20 = 1\,900 \text{ m}^2; 20 \times 25 = 500 \text{ m}^2; 1\,900 + 500 = 2\,400 \text{ m}^2 \checkmark\checkmark\checkmark\checkmark\checkmark$
- 4.2 $95 + 45 + 20 + 25 + 75 + 20 = 280 \text{ m} \checkmark\checkmark\checkmark\checkmark\checkmark$

Worksheet 10 Shapes and objects: complex problem solving

1. Volume of duck pond: $3,142 \times 175^2 \times 25 = 2\,405\,593,75 \text{ cm}^3 \checkmark\checkmark\checkmark\checkmark$
2. Half base of frame: $4 \div 2 = 2 \text{ m}$
 $c^2 = 2^2 + 6^2 = 4 + 36 = 40; c = \sqrt{40} = 6,32 \text{ m}$
Perimeter: $(6,32 \times 2) + 4 = 16,64 \text{ m} \checkmark\checkmark\checkmark\checkmark\checkmark$
3. Area of sandpit: $\frac{1}{2} \times 22,5 \times 22,5 = 253,13 \text{ m}^2 \checkmark\checkmark\checkmark$
4. Area: $3 + 1 = 4; 4 \times 4 = 16 \text{ m}^2 \checkmark\checkmark\checkmark$
5. Area: $\frac{1}{4} \times (3,142 \times 1,52) = 1,77 \text{ m}^2 \checkmark\checkmark\checkmark\checkmark$
6. Radius = $1,15 \div 2 = 0,575 \text{ m}$
Length: $2\,500 \text{ mm} \div 1\,000 = 2,5 \text{ m}$
Surface area of play-pipe: $(2 \times 3,142 \times 0,575) \times 2,5 = 9,03 \text{ m}^2 \checkmark\checkmark\checkmark\checkmark\checkmark$
7. Total area: $45\,000 \div 1\,000 = 45 \text{ m}; 20 \times 45 = 900 \text{ m}^2 \checkmark\checkmark\checkmark$
8. Circumference of pond: $2 \times 3,142 \times 175 = 1\,099,70 \text{ cm} \checkmark\checkmark\checkmark$

Exam-type questions

- 1.1 Width: $3,2 \times 6 = 19,20 \text{ m};$ Length: $24 \text{ m};$ Dimensions: $19,20 \text{ m} \times 24 \text{ m} \checkmark\checkmark\checkmark\checkmark$
- 1.2 $(24 \times 2) + (2 \times 19,20) = 48 + 38,4 = 86,40 \text{ m} \checkmark\checkmark\checkmark$
- 1.3 $19,2 \times 24 \times 3,5 = 1\,612,80 \text{ m}^3 \checkmark\checkmark\checkmark\checkmark$
- 1.4 Radius of oval end: $72 \div 2 = 36 \text{ m}$
Length of rectangle: $105 - 36 - 36 = 33$
Area = area of 2 semi-circle ends + area of rectangle
 $= (3,142 \times 36^2) + (72 \times 33) = 4\,072,03 + 2\,376 = 6\,448,03 \text{ m}^2 \checkmark\checkmark\checkmark\checkmark\checkmark\checkmark$
- 2.1 Length: $2 + 1,5 + 2,5 = 6 \text{ m};$ Area: $6 \times 5 = 30 \text{ m}^2 \checkmark\checkmark\checkmark\checkmark$
- 2.2 Width: $5 - 2,5 = 2,5 \text{ m}; 2,5 \times 4 = 10;$
Length: $(2,5 \times 2) + (2 \times 2) = 5 + 4 = 9;$
Perimeter: $9 + 10 = 19 \text{ m} \checkmark\checkmark\checkmark\checkmark$
Or Bedroom 1: $(2,5 \times 2) + (2,0 \times 2) = 5 + 4 = 9 \text{ m};$
Bedroom 2: $(2,5 \times 2) + (2,5 \times 2) = 5 + 5 = 10 \text{ m};$
Perimeter: $9 + 10 = 19 \text{ m} \checkmark\checkmark\checkmark\checkmark$
- 2.3 $500 \text{ mm} \div 1\,000 = 0,5 \text{ m}; 300 \text{ mm} \div 1\,000 = 0,3 \text{ m};$
Perimeter outside walls: $6 + 6 + 5 + 5 = 22$
Volume of foundation: $22 \times 0,5 \times 0,3 = 3,3 \text{ m}^3 \checkmark\checkmark\checkmark\checkmark\checkmark$
- 2.4 Outside wall surface area: perimeter \times height = $22 \times 2,4 = 52,8 \text{ m}^2;$
Remove area of windows and doors: $52,8 - 12,8 = 40 \text{ m}^2 \checkmark\checkmark\checkmark\checkmark\checkmark$

- 2.5.1 Radius of sink: $30 \div 2 = 15$ cm
 Volume of sink: $3,142 \times 15^2 \times 6 = 4\,241,70$ cm³ ✓✓✓✓
- 2.5.2 Surface area of sink:
 $(3,142 \times 152) + (2 \times 3,142 \times 15 \times 6) = 706,95 + 565,56 = 1\,272,51$ cm² ✓✓✓✓✓
- 2.5.3 One load of dish-washing: $4\,241,7 \times 70\% = 2\,969,19$ cm³
 Washing 4 times per day for 10 days: $2\,969,19 \times 4 \times 10 = 118\,767,60$ cm³ ✓✓✓✓✓✓✓
- 3.1 $0,35$ m \times $100 = 35$ cm; $0,20$ m \times $100 = 20$ cm; $35 \times 20 = 700$ cm² ✓✓✓✓✓
- 3.2 Bottom of tank: $(35 \times 20 \times 1) = 700$ cm³
 Long sides of tank: $2(35 \times 30 \times 1) = 2\,100$ cm³
 Short sides of tank: $2(30 \times 20 \times 1) = 1\,200$ cm³
 Total volume of glass: $700 + 2\,100 + 1\,200 = 4\,000$ cm³ ✓✓✓✓✓✓✓
- 3.3 $(2 \times 35) + (2 \times 20) = 70 + 40 = 110$ cm ✓✓✓
- 3.4.1 $35 \times 20 \times 30 = 21\,000$ cm³; $21\,000$ cm³ = $21\,000$ mL
 $21\,000$ mL \div $1\,000 = 21$ L \times $85\% = 17,85$ L ✓✓✓✓✓✓✓
- 3.4.2 Usually table- and teaspoons or measuring spoons, in this case use a measuring jug. ✓✓
- 3.4.3 $72,5 \times 1\,000 = 0,0725$ L salt used per litre water
 $17,85 \times 0,0725 = 1,29$ L = $1\,290$ mL salt needed for the tank. ✓✓✓

Solutions: Topic 5 – Graphs

Worksheet 1 Pie charts

- 1.1 $400 \times 45\% = 180$ girls ✓✓✓
 1.2 $400 \times 30\% = 120$ girls ✓✓
 1.3 $360^\circ \times 25\% = 90^\circ$ ✓✓✓
 1.4 Hockey: $95\ 000 \times 45\% = R42\ 750$
 Netball: $95\ 000 \times 30\% = R28\ 500$
 Cycling: $95\ 000 \times 25\% = R23\ 750$ ✓✓✓✓
 1.5 No, the sports pie chart is divided into percentages and the budget will use these percentages to calculate the budget pie chart. ✓✓✓
- 2.1 $22\% \times 225 = 49,5$ km² ✓✓
 2.2 $360 \times 22\% = 79,2^\circ$ ✓✓✓✓
 2.3 $42\% \times 225 = 94,50$ km² ✓✓✓✓
 2.4 $14\% \times 225 = 31,50$ km² ✓✓✓✓
 2.5 $360 \times 14\% = 50,4^\circ$ ✓✓✓✓
 2.6 $79,2^\circ$ ✓✓

Worksheet 2 Complex pie charts

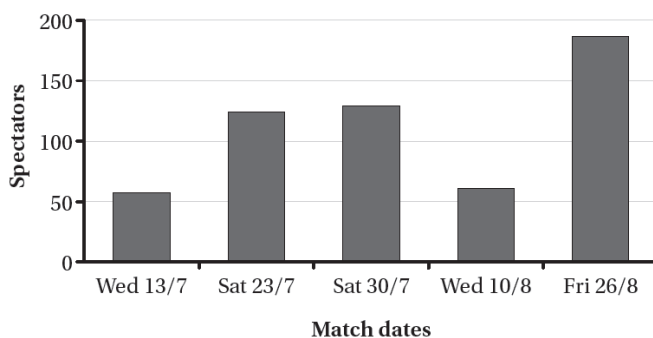
- 1.1 35% ✓✓
 1.2 $45\ 891 \times 4\% = 1\ 835,64$ mW ✓✓✓
 1.3 $995 \times 15\% = 149,25$; $995 - 149,25 = 845,75$ kWh ✓✓✓
 1.4 $45\ 891 \times 12\% = 5\ 506,92$ mW ✓✓
 1.5 $360 \times 12\% = 43,20$ ✓✓✓
 1.6 $100\% - 15\% = 85\%$; $5\ 506,92 \times 85\% = 4\ 680,88$ mW ✓✓✓✓
- 2.1 $15/90 \times 100 = 16,66\% \approx 17\%$ ✓✓
 2.2 $360 \times 20\% = 720$ ✓✓
 2.3 $90 - (15 + 18 + 9 + 20) = 28$ ✓✓
 2.4 $360 \times 30\% = 1080$ ✓✓
 2.5 $20/90 \times 100 = 22,22\% \approx 23\%$ ✓✓
 2.6 3600 ✓✓
 2.7 10% ✓✓

Worksheet 3 Bar graphs

- 1.1 20 ✓✓
 1.2 $10 + 5 + 25 = 40$ ✓✓✓
 1.3 $3 \times (15 + 20 + 40) = 225$ bottles ✓✓✓✓

2.1

Spectators attending soccer matches



✓✓✓✓✓✓✓✓

- 2.2 Yes, more spectators over Fridays and Saturdays. ✓✓
 2.3 Fridays and Saturdays ✓✓
 2.4 The players reacted very well to the spectator support. ✓✓✓

- 3.1 Family ✓✓
- 3.2 Parents would choose these movies so the whole family can watch. ✓✓
- 3.3 0; There is no bar. ✓✓✓

Worksheet 4 Complex bar graphs

- 1.1 +/- R1 000 ✓✓
- 1.2 April ✓✓
- 1.3 +/- R1 495 ✓✓

2.1

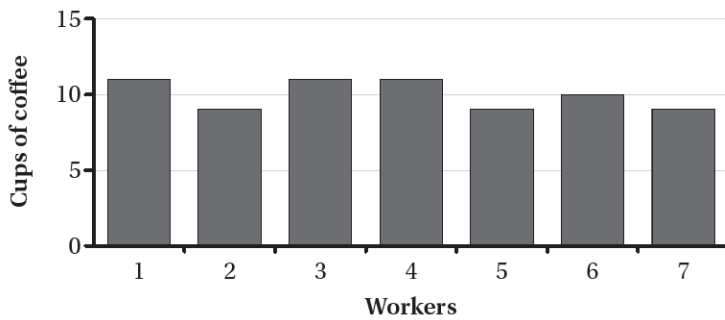
Number of worker	Tally	Frequency
1		11
2		9
3		11
4		11
5		9
6		10
7		9

✓✓✓✓✓✓✓✓

2.2 $11 + 9 + 11 + 11 + 9 + 10 + 9 = 70$ ✓✓

2.3

Cups of coffee by 7 workers



✓✓✓✓✓✓✓✓

2.4 Workers 1, 3 and 4 ✓✓

2.5 $(70 \div 150) \times 100 = 46,67\%$ ✓✓✓✓

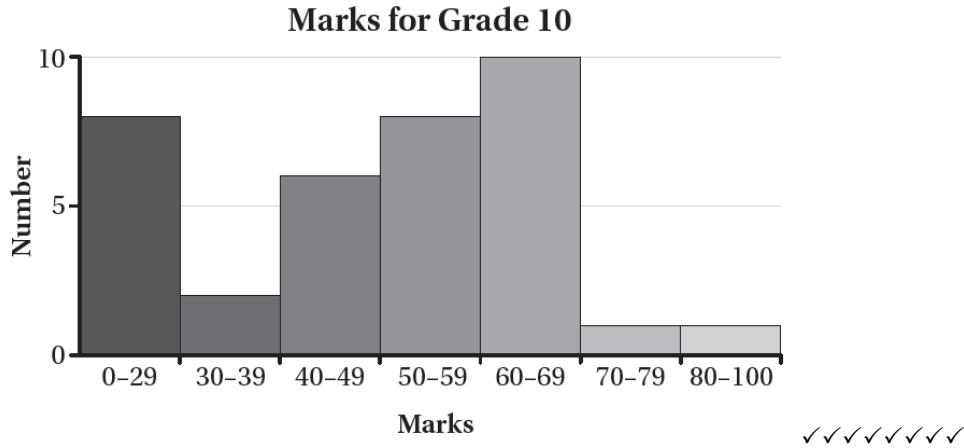
Worksheet 5 Histograms

1.1

Class interval	Tally	Frequency
0-29		8
30-39		2
40-49		6
50-59		8
60-69		10
70-79		1
80-100		1
Total		36

✓✓✓✓✓✓✓✓

1.2

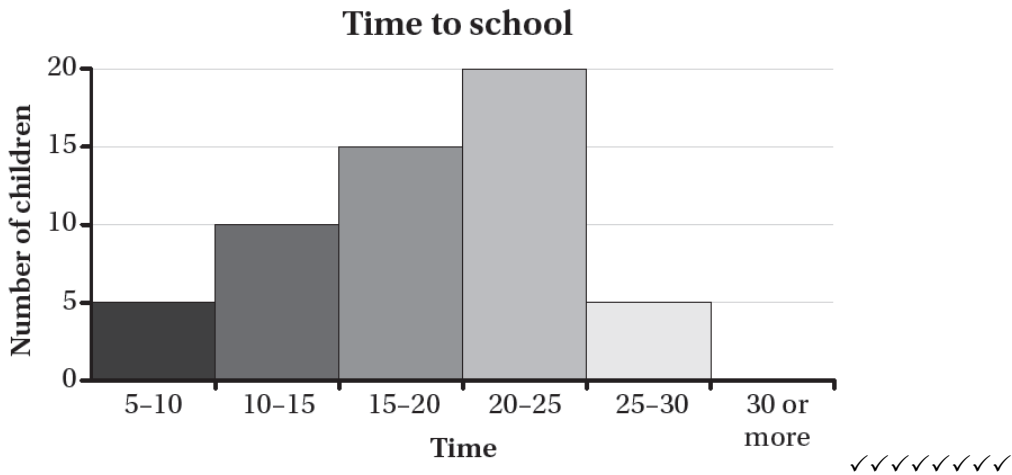


- 1.3 Marks were divided into groups. The bars do not represent distinct values, rather a range of values. ✓✓
- 1.4 Yes, most marks are in the range 40-69. ✓✓
- 1.5 The learners do not understand the work completely. Very few learners received marks above 70 and there was a considerable number who received less than 40 marks. ✓✓✓
- 2.1 30,1-35: Sports people tend to live healthily and are not overweight. ✓✓✓
- 2.2 Less than 20 ✓✓
- 2.3 It means that most of the players are in that group. ✓✓
- 2.4 $60\% \times 63 = 37,8 \approx 38$ players ✓✓✓
- 2.5 They will fall in the healthy weight category; they will have average to good BMI's. ✓✓

Worksheet 6 Complex histograms

- 1.1.1 5 ✓
- 1.1.2 10 ✓
- 1.1.3 15 ✓
- 1.1.4 20 ✓
- 1.1.5 5 ✓
- 1.1.6 0 ✓

1.2

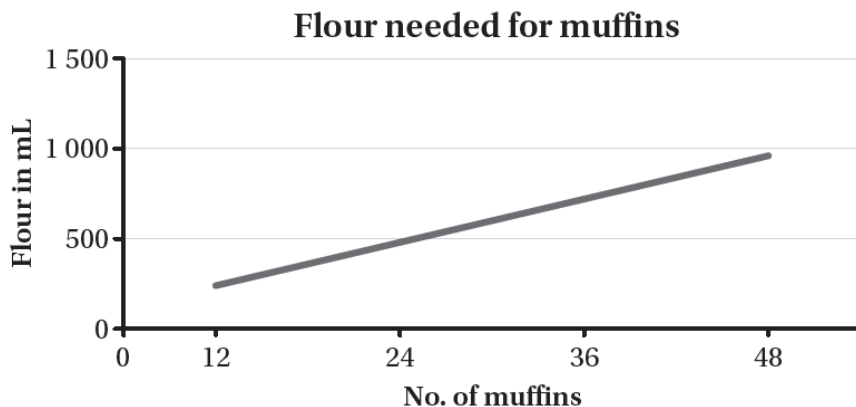


- 1.3 Urban. Most of the learners live within 30 minutes from the school. ✓✓✓
- 1.4 $(25 \div 55) \times 100 = 45,45\%$ ✓✓✓
- 2.1 $1-1,5 = 4$; $1,6-2 = 4$; $2,1-2,5 = 10$; $2,6-3 = 2$; $3-3,5 = 8$; $3,6-4 = 2$ ✓✓✓✓✓✓✓
- 2.2 $4 + 4 + 10 + 2 + 8 + 2 = 30$ fish ✓✓
- 2.3 $\frac{2}{30} \times 100 = 6,67\%$ ✓✓✓
- 2.4 Most fish masses are below 2,5 kg ✓✓✓

- 2.5 Learners' own answers e.g. "Number of fish caught at different masses". ✓✓
- 2.6 Horizontal = Mass; Vertical = Number of fish caught ✓✓✓✓
- 2.7 1,6–2,0: When 1,55 is rounded, it becomes 1,6. ✓✓
- 2.8 Yes, masses were divided into groups, they are ranges not distinct values. ✓✓✓

Worksheet 7 Line graphs

- 1.1.1 36 ✓
- 1.1.2 480 ✓
- 1.1.3 960 ✓
- 1.2



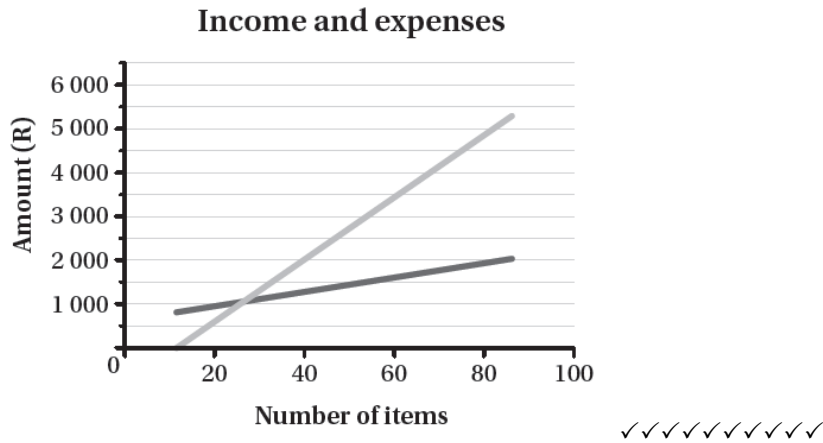
✓✓✓✓✓

- 1.3 Straight line ✓✓
- 1.4 $5 \times 240 = 1\,200$ mL ✓✓✓
- 2.1 Horizontal = Number of glasses of lemonade sold; Vertical = Income ✓✓
- 2.2 40 glasses ✓✓
- 2.3 R75 ✓✓
- 2.4 If nothing is sold no income will be received. ✓✓
- 2.5 Straight line because there is a direct relationship between the income and number of glasses sold. ✓✓
- 2.6 $150 \div 20 = R7,50$ ✓✓
- 2.7 $45 \times 16 = 720$ glasses of lemonade ✓✓✓
- 2.8 $720 \times 7,5 = R5\,400$ ✓✓✓
- 2.9 $100 - 27 = 73\%$; $5\,400 \times 73\% = R3\,942$ ✓✓✓✓

Worksheet 8 Complex line graphs

- 1.1 The R100 is a fixed cost and includes 50 free minutes. ✓✓
- 1.2 250 minutes (from graph) ✓✓
- 1.3 $R175 = 200$ minutes; $200 - 50 = 150$ minutes ✓✓✓
- 1.4 $250 - 50 = 200$ additional minutes cost R100;
150 additional minutes cost R75 so $\frac{100}{200}$ or $\frac{75}{150} = 0,5$
 \therefore 1 additional minute costs R0,50. ✓✓✓✓
- 1.5 Total cost = $100 + 0,5(\text{total minutes used} - 50)$ ✓✓✓
- 2.1.1 $1\,000 + (10 \times 15) = R1\,150$ ✓✓
- 2.1.2 $10 \times 65 = R650$ ✓✓
- 2.1.3 $20 \times 65 = R1\,300$ ✓✓
- 2.1.4 $1\,000 + (100 \times 15) = R2\,500$ ✓✓

2.2

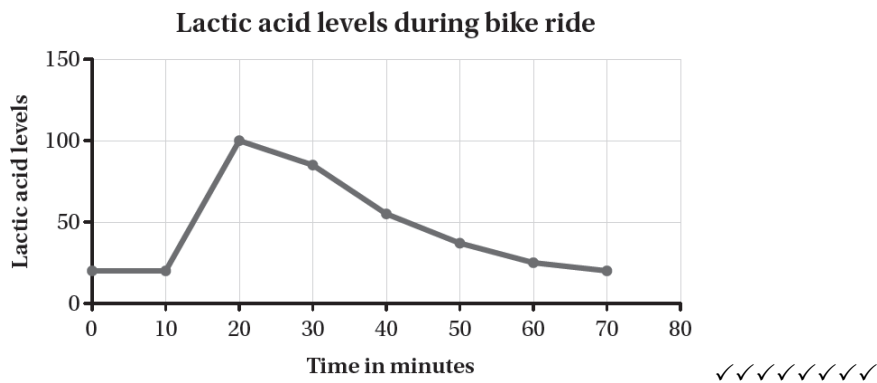


2.3 20 items ✓✓✓

Worksheet 9 Broken line graphs

- 1.1 $300 \div 60 = 5$ minutes ✓✓✓
- 1.2 20 m/s ✓✓
- 1.3 $210 - 150 = 60$ seconds ✓✓✓
- 1.4 Learners' own answers to indicate stopping e.g. "Stop at traffic light, rest". ✓✓
- 1.5 $20 \times 60 = 1\ 200$ m (= 1,2 km) ✓✓✓

2.1



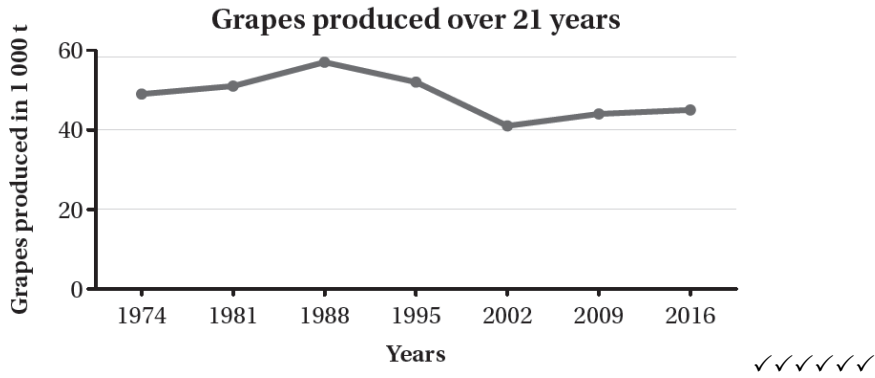
- 2.2 Broken line graph ✓✓
- 2.3 Lactic acid levels which were constant at 20 quickly rise to 100 and then slowly decrease as she continues to ride her bike. ✓✓✓
- 2.4 $70 \text{ min} - 10 \text{ min} = 60$ minutes ✓✓✓✓

Worksheet 10 Complex broken line graphs

- 1.1 Broken line graph ✓✓
- 1.2 20% ✓✓
- 1.3 December ✓✓
- 1.4 Holidays for families ✓✓
- 1.5 Budget is tight after the holiday; children need new things for school. ✓✓✓✓
- 1.6 $(41\ 500 \times 70\%) + (41\ 500 \times 60\%) = 29\ 050 + 24\ 900 = R53\ 950$ ✓✓✓✓✓
- 1.7 $(18\ 675 \div 41\ 500) \times 100 = 45\%$ ✓✓✓

- 2.1 7 years ✓✓
- 2.2 57 000 t ✓✓
- 2.3 $41\ 000 + 44\ 000 + 45\ 000 = 130\ 000$ t ✓✓✓
- 2.4 $\frac{57\ 000 - 51\ 000}{7} = \frac{6\ 000}{7} = 857,14$ t ✓✓✓

2.5



- 2.6 The tendency is that there are highs and lows. During 1980s production was high and then it declined. In the 2000s it increased again. ✓✓
- 2.7 It will keep increasing when looking at the tendency. ✓✓

Exam-type questions

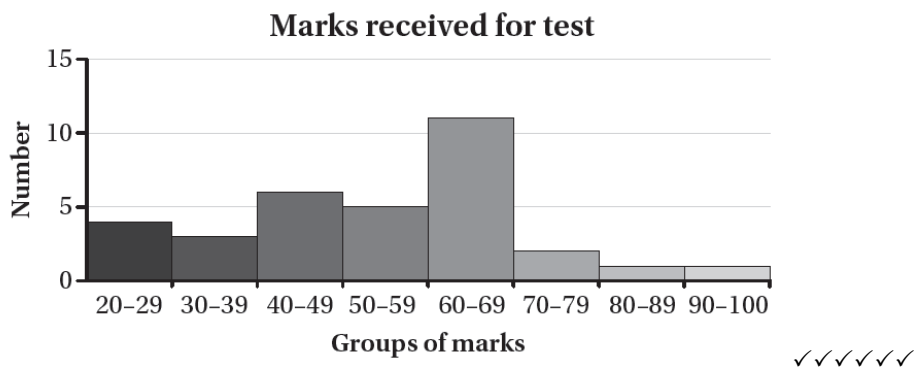
- 1.1 50 minutes ✓✓
- 1.2 10 km ✓✓
- 1.3 15 minutes ✓✓
- 1.4 5 minutes ✓✓
- 1.5 10 minutes ✓✓
- 1.6 30 km ✓✓
- 1.7 Convert to minutes: $50 \div 60 = 0,8333$; Speed = $30 \div 0,8333 = 36$ km/h ✓✓✓

2.1

Class intervals	Frequency
20-29	4
30-39	3
40-49	6
50-59	5
60-69	11
70-79	2
80-89	1
90-100	1

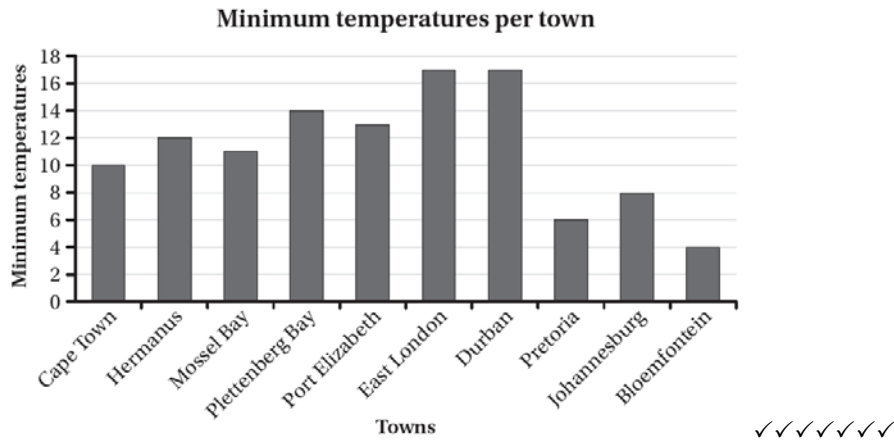
✓✓✓✓✓✓

2.2



- 2.3 60-69 ✓✓
- 2.4 A histogram is best because the data is divided into groups. ✓

3.1



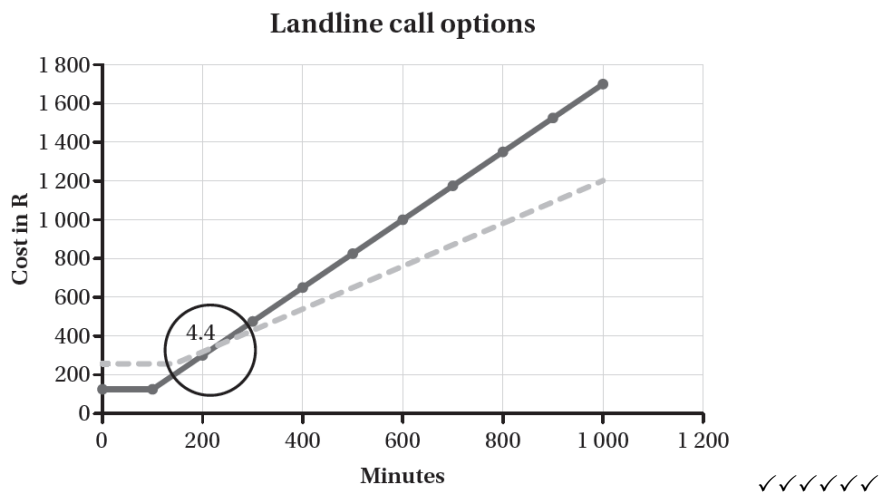
3.2 All at the coast ✓✓

3.3 Hermanus, Port Elizabeth, Plettenberg Bay are all suitable ✓✓

4.1 Total cost = 225 + 1,15(minutes - 125 minutes) ✓✓✓

4.2 225 + 1,15(413 - 125) = R556,20 ✓✓✓✓

4.3



4.4 On the graph ✓✓✓

4.5 +/- R333,54

+/- 219,16 minutes {learners will read off graph} ✓✓

5.1 $\frac{9}{24} \times 100 = 37,5\%$ ✓✓

5.2 $279 \times 17,92\% = 49,9968 = 50$ people ✓✓✓

5.3 Skyfall ✓✓

5.4 $\frac{24}{279} \times 100 = 8,60\%$ ✓✓✓

5.5 Moonraker; Thunderball; Dr No ✓✓✓

5.6 No. These are the Bond films that were watched and seen as favourites by the people asked in the research. ✓✓✓

Solutions: Topic 6 – VAT and tariffs

Worksheet 1 VAT calculations

- 1.1 $R136,80 - R120 = R16,80$ ✓✓
1.2 $0,14 \times R13,12 = R1,84$ ✓✓
1.3 $0,14 \times R18 = R2,52$ ✓✓
1.4 $0,14 \times R350 = R49$ ✓✓
- 2.1 $R120 + R16,80 = R136,80$ ✓✓
2.2 $1,14 \times R20,55 = R23,43$ ✓✓
2.3 $1,14 \times R32,99 = R37,61$ ✓✓✓
2.4 $1,14 \times R14,99 = R17,09$ or $R14,99$ if zero-rated ✓✓✓
- 3.1 $R136,80 - R16,80 = R120$ ✓✓✓
3.2 $R4\ 999 \div 1,14 = R4\ 385,09$ ✓✓✓
3.3 $R75\ 000 \div 1,14 = R65\ 789,47$ ✓✓✓
3.4 $R425 \div 1,14 = R372,81$ ✓✓✓

Worksheet 2 Tax invoice and till slip

- 1.1 False, Total Due is the VAT-inclusive price, VAT is quoted separately ✓✓
1.2 $0,14 \times R44,40 = R6,22$ ✓✓
1.3 $1,14 \times R16,90 = R19,27$ ✓✓✓
- 2.1 Cauliflower and Milk ✓
2.2 The consumer doesn't pay VAT on these items. ✓
2.3 $R9,99 + R13,99 = R23,98$ ✓✓
2.4 VAT-inclusive ✓
2.5 Adding all the items: $R14,76 + R8,76 + R9,99 + R13,99 + R17,70 = R65,20$ ✓✓✓
2.6 $R65,20 \div 1,14 = R57,19$; $R65,20 - R57,19 = R8,01$ ✓✓✓✓
2.7 R0; it's a zero-rated item. ✓

Worksheet 3 Financial documents: Credit card statement

1. March or the 3rd month ✓
2. $R85 + R155,65 = R240,65$ ✓✓
3. 7 March 2017 ✓
4. $R128,60$ ✓
5. Yes, R400. Credit column shows R400 ✓✓
6. 21% of the money owed ✓
7. No, the interest rate does not change if the amount owed changes. ✓✓

Worksheet 4 Financial documents: Bank statement

1. 2 July 2017 ✓
2. 712 ✓
3. There's an overdraft of R8 120, 85, meaning that this amount was withdrawn even though this person did not have money in the account. ✓

4. A: $-R8\ 120,85 + R10\ 560,00 = R10\ 429,15$; Money was put into the account so the amount became positive. ✓
 B: $R10\ 429,15 - R780,00 = R9\ 649,15$ ✓
 The large deposit removed the overdraft, so there is now money in the account and there is no longer a minus sign on the balance. ✓
5. It is money taken out of the account. ✓
6. $R780 + R1\ 248,50 = R2\ 028,50$ ✓✓
7. $R359,48 + R345,28 = R704,76$ ✓
8. $R4\ 000 - R3\ 823,34 = R176,66$ ✓
 R4 000 was paid into the account. ✓
 The account is no longer overdrawn, so the balance now has a positive sign. ✓
9. $13,5\% \times (-R3\ 460,60) = -R467,18$ ✓✓
10. $(-R3\ 460,60) + (-R467,18) = -R3\ 927,78$ ✓✓
11. No, just one rate (interest of 13,5%) is charged for the overdraft, no matter how much the amount is. ✓✓

Worksheet 5 Tariffs on bank statements

1. $2,2\% \times R4\ 615,45 = R101,54$ ✓✓
 $R4\ 615,45 + R101,54 = R4\ 716,99$ ✓✓
2. The table lists the amount of interest that will be earned by the balance in the bank account. The rate is dependent on the balance. The higher the bank balance, the higher the interest rate. The balance in this question falls in the range R4 500–R9 999. Therefore the rate of 2,2% is used to calculate the interest earned. ✓✓✓✓
3. $R4\ 716,99 + R2\ 400 = R7\ 116,99$ ✓
 $102,2\% \times R7\ 116,99 = R7\ 273,56$ ✓
 $R7\ 273,56 + R2\ 400 = R9\ 673,56$ ✓
 $102,2\% \times R9\ 673,56 = R9\ 886,38$ ✓
 $R9\ 886,38 + R2\ 400 = R12\ 286,38$ ✓
 $105,5\% \times R12\ 286,38 = R12\ 962,13$ ✓✓

Worksheet 6 Financial documents: Municipal account

- 1.1 4 May 2017 ✓
 1.2 April 2017 ✓
 1.3 It's the payment that was made. This amount was paid into the account. ✓
 1.4 There is still R33,74 left in the account, a positive balance. ✓
 1.5 It is the value of this property. ✓
 1.6

Tariff for residential tax				Yearly	Monthly
Valuation	1.6.1 R1 102 800 ✓				
Discount	-R50 000				
Total	1.6.2 R1 052 800 ✓	×	0,0031	1.6.3 R3 263,68 ✓	1.6.4 R271,97 ✓
- 20% of the total	1.6.5 -R210 560 ✓	×	0,0031	1.6.6 -R652,74 ✓	1.6.7 -R54,35 ✓
Amount				1.6.8 R2 610,94 ✓	1.6.9 R217,62 ✓
+ 10% of the amount PPS	1.6.10 R2 610,94 ✓	×	10%	1.6.11 R261,09 ✓	1.6.12 R21,76 ✓
Total amount				1.6.13 R2 872,03 ✓	1.6.14 R239,34 ✓

- 2.1 14 kilolitres [6 kL + 8 kL] ✓ $10,32 + 0 + 104,65 + 59,10 = R174,07$ ✓
 2.2.1 The first 6 kL are free, thus the amount is R0. ✓
 2.2.2 The VAT on R0 is R0. ✓
 2.2.3 The sum is R0. ✓

- 2.2.4 $14 - 6 = 8 \text{ kL}$ ✓
 $8 \text{ kL} @ R6,48/\text{kL} = R51,84$ ✓
- 2.2.5 $\frac{14}{100} \times 51,84 = R7,26$ ✓✓
- 2.3 Total amount = Basic electricity (R165,53) + Consumption (R416,20) = R581,73 ✓✓
- 2.4 Total units broken down according to the tariff table: $200 + 200 + 62 = 462$ units
 Thus $200 \times 0,6945 = R138,90$ ✓✓
 $200 \times 0,7434 = R148,68$ ✓✓
 $62 \times 1,2502 = R77,51$ ✓✓
 Total = R365,09 excl. VAT ✓
 Total plus VAT = R416,20 ✓
 Add admin fee (incl. VAT) = R165,53 ✓
 Total amount due (incl. VAT) = R581,73

Exam-type questions

- 1.1 $R237,90 \times 0,14 = R33,31$ ✓✓
 1.2 $R11\,500 \times 0,14 = R1\,610$ ✓✓
- 2.1 $R525,32 \times 1,14 = R598,86$ ✓✓✓
 2.2 $R4\,700 \times 1,14 = R5\,358,07$ ✓✓✓
- 3.1 $R56,80 \div 1,14 = R49,82$ ✓✓✓
 3.2 $R1\,943 \div 1,14 = R1\,704,39$ ✓✓✓
- 4.1 The pineapple is zero-rated as indicated by the hash, and costs R15,76. ✓✓
 4.2 $R50,64 - R15,76 = R34,88$ ✓✓
 4.3 Total price of items with VAT = R21,89 (ham) + R15,76 (cooldrink) = R37,65 ✓
 VAT-excl. price for these items = $\frac{37,65}{1,14} = R33,03$ ✓
 The VAT paid is the difference between these two amounts, thus $R37,65 - R33,03 = R4,62$ ✓
- 4.4 $\frac{21,89}{1,14} = R19,20$ ✓✓
 4.5 The customer doesn't get a refund on sale items. No refund. ✓
 4.6 A quotation is given before the customer pays to show how much the items will cost. An invoice is given after the customer has paid for items purchased or service rendered. ✓✓
- 5.1 A tariff is a way of pricing goods or services. A fixed rate is applied per unit(s) of the item supplied. The rate may change depending on the category i.e. the rate may increase or decrease depending on the usage. ✓✓
- 5.2 Flash-data: 1 GB offered on subscription + 2×500 MB additional data
 $= R169,00 + (2 \times R100) = 169 + 200$
 $= R369$
 Rom-data: 2 GB offered on subscription = R299
 \therefore Rom-data is the cheapest option ✓✓✓✓✓
- 5.3 Start-up = Installation + Delivery = $R125 + R100 = R225$ ✓✓✓
- 5.4 4 GB = 2 GB from subscription + one 2GB bundle = $R299 + R375 = R674$ ✓✓
- 5.5 Flash-data:
 1 GB = R169
 4 GB = $2 \times 350 = 700$
 Total 5 GB = R869
 Rom-data:
 2 GB = R299
 $2 \times 500 \text{ MB} = R300$
 2 GB = 375
 Total 5 GB = R974
 \therefore Flash-data is the best option. ✓✓✓✓✓
- 6.1 The "Date of reading" is in the previous month. Information that was read needs to be loaded onto the system and billing amounts calculated before account is printed. ✓
- 6.2 S 0134 782 ✓

- 6.3 64 kL used. Break down this amount according to the tariff table; (6 + 24 + 30 + 4 = 64 kL)
6 × R0 = R0
24 kL × R6,48 = R155,52
30 kL × R16,20 = R486,00
4 kL × R21,60 = R86,40
Total = R727,92
∴ The water amount was calculated correctly. ✓✓✓✓✓
- 6.4 512 units used. Break down this amount according to the tariff table; (200 + 200 + 112 = 512 units)
Admin cost = R163,50
200 × 0,6945 = R138,90
200 × 0,7434 = R148,68
112 × 0,8196 = R91,80
Total = R542,88
∴ The electricity amount was calculated correctly. ✓✓✓✓✓
- 6.5 Learners' own answers. For example, you would need to look at a previous account, preferably from before restrictions were imposed to compare the costs and usage. ✓✓